

# THE IRON AGE

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## What to Consider Before Relocating a Plant

By R. M. FISCHER

WITH the expansion of the local craftsman into a large-scale manufacturer with nation-wide markets, the economic problem of location—the most favorable site for factories and warehouses—has steadily gained in importance. A constant migration of industrial centers, involving capital displacements of many hundreds of millions every year, follows the growth and geographical shifting of population and markets, the development and subsequent depletion of natural resources, and the changes in styles and the standards of living linked with technical progress. Government estimates place the number of relocations of industrial enterprises during the year 1929 at about 10,000 individual cases.

This movement is influenced by business cycles, but is not a direct variable thereof. It is somewhat accentuated by depressions, due to the accompanying fluctuation of commodity prices, intensified competition and narrowing profit margins. These are likely to result in unbalanced production and distribution or basic changes in the rate structure for transportation, power and other services.

### Trend Toward Decentralization

Aside from these major causes, more temporary trends are present, such as the current tendency toward decentralization. The early advantages of metropolitan marketing areas are being gradually extended to the smaller community since the advent of interconnected power systems,

SHIFTS in population and markets, wider distribution of electric power and good roads, and inequalities in tax burdens and statutory restrictions are among the various causes of industrial migration.

Relocation of a plant, however, involves many risks and uncertainties and should not be undertaken without careful analysis of the advantages and disadvantages of the move. The author, who is identified with the engineering economics division of the American Appraisal Co., Milwaukee, outlines a logical and comprehensive procedure to follow in making a relocation study.

ation of the changes in the economic structure.

### Whether, Where and When to Move

A serious responsibility rests with the executive who is confronted with the problem of relocation due to the importance of geographical location upon the success of most enterprises. A thorough analysis is essential to reaching an intelligent decision. The problem stated concisely is: Whether, where and when to move?

The answer to the first two questions resolves itself into a specific comparison of anticipated operating results in alternative locations and consideration of the additional capital investment which we shall attempt to illustrate in this discussion.

Thereafter, the desirable time for relocation depends, in most instances, on the liquidity and relative importance of the investment in any specific enterprise. It is obvious that the annual economies to be obtained in the new location must overbalance the carrying charges and amortization of the total additional cost involved in moving. Since the efficiency of and the continuing charges on abandoned facilities decrease with time, due to the influence of physical deterioration and the ravages of obsolescence, relocation may be feasible today which would not have been economically justified a few years ago.

Of course, in the case of industries where land, buildings and fixed equipment are utilized in the processing of

truck distribution of merchandise and similar technical improvements, especially where there is the additional incentive of nearby raw materials, and more stable, low-price labor. Tax policies of the various States have much to do with the unrest of industrial enterprises. We are, in fact, likely to witness an intensified regrouping movement in the coming years, when the many conflicting trends may have become stabilized to a degree, which will permit the necessary long-term planning and evalu-

TABLE I  
ANNUAL REQUIREMENTS

	Old Location	New Location	
		Site A	Site B
Labor—Man-hours			
Common	100,000	85,000	80,000
Skilled	20,000	22,000	20,000
Raw Materials—tons	25,000	25,000	25,000
Fuel —tons	4,000	3,200	3,000
Power —kwhr.	500,000	460,000	470,000
Water —gal. per day	200,000	180,000	175,000
Floor space —sq. ft.			
Department "A"	28,000	26,500	26,500
Department "B"	15,000	12,000	10,500
Railroad sidings—lin. ft.	1,500	1,800	700
Wharfage —lin. ft.			1,000

raw materials of a bulky character and thereby comprise the major portion of the capital investment, such as a cement plant, auspices for favorable relocation are usually doubtful, especially where production is tied to developed natural resources.

On the other hand, a manufacturer of novelties in rented floor space may easily move his few machines and inventory over night at small cost and with little loss of production time. The average case naturally ranges somewhere between these extremes—indicating the necessity for thorough analysis upon which to predicate sound judgment in order to "make the right move."

#### What to Look for in a New Location

If a tentative estimate of the possibilities gives a satisfactory answer in the affirmative to the question "whether to move," a more detailed comparison with the most favorable location follows. The latter is generally indicated by some outstanding advantages, such as cheap and reliable labor supply, proximity of markets or raw materials, free or inexpensive plant site or floor space, tax reductions and other similar inducements offered. To obtain a definite measure of the anticipated changes in conditions, it is necessary to establish estimates of requirements, unit costs and other data, which form the basis of a hypothetical operating comparison. This should include all factors which are affected by the relocation. To illustrate the various steps an example has been set up which does not necessarily represent conditions in any specific industry, but which is indicative of the problems involved and a logical procedure in weighing the advantages and disadvantages. Detail has been purposely avoided.

For clarity in interpretation, this example has been prepared in the form of five tables, each designed to cover one phase of the comparison, the steps being as follows:

Table I.—Annual requirements—a quantitative comparison of the respective plant operating demands.

Table II.—Annual operating cost—a comparative evaluation of such costs under anticipated normal operating requirements.

Table III.—Cost of moving—a comparative summary of the estimated net capital outlay to be incurred in relocation.

Table IV.—Cost of distribution—a comparison of distribution costs, as distinguished from those of production.

Table V.—Summary—a resume of the net advantages or disadvantages developed, including the consideration of essential carrying charges upon added capital; presentation of the essential facts before the ultimate decision is made by the executive.

#### Analyzing Operating Requirements

These tables are now discussed in more detail. Table I is developed from an analysis of controlling oper-

ating requirements in the existing enterprise with corresponding data as estimated under the changed conditions in another city, where a site "A" and a site "B" are under consideration.

Plant records will, of course, furnish the basis of such estimates, but it would not be satisfactory to take a more or less "statistical" attitude in regard to the figures for labor man-hours in the various trades, raw materials, fuel, water and power consumption, floor space requirements, etc. Historical trends must be considered—probable future expansion of production or retrenchment in certain departments will have to find expression in the figures for the new location.

Plant facilities, once established, are generally subject to limited piecemeal construction as the enterprise expands. Cramped quarters or illogical layout of departments are the natural by-product of the process; and the elimination of these drawbacks in a uniform "ideal" layout offers opportunity for the scrapping of obsolete processes and equipment, in some instances enough inducement for relocation even within the same city. If planning on the basis of conservative forecasts indicates satisfactory savings in operating cost, the investment in new equipment may be warranted. These changes are then incorporated in the new plant requirements, which govern plant layout and utilization of given areas.

In our table it has been assumed that considerable labor-saving equip-

TABLE III  
COST OF MOVING

Cost of New Facilities	To Site "A"	To Site "B"
Land	\$13,000	\$40,000
Land improvements	20,000	58,000
Buildings	80,000	75,000
Building fixtures	10,000	10,000
Additional machinery and equipment	52,000	86,700
Total new facilities	\$175,000	\$269,700
Reinstallation of original equipment	\$8,000	\$7,000
Total cost	\$183,000	\$276,700
Cost of Removal		
of reused machinery, inventory and business records, including insurance	\$8,000	\$7,800
Indirect Costs		
Training of employees	\$12,000	\$15,000
Times losses in production	5,000	5,000
Contingencies and breakage	5,000	5,000
Total indirect costs	\$22,000	\$25,000
Grand total—gross cost of removal	\$213,000	\$309,500
Less disposal value of old facilities:		
Real estate and land improvements	\$45,000	
Salvage value of unusable equipment	9,000	
Total	\$54,000	\$54,000
Net cost of moving	\$159,000	\$255,500

ment is to be installed. Site "A" has only rail facilities and is offered at negligible cost, while site "B" fronts on a canal and, therefore, requires additional handling facilities with a considerable outlay for the land and improvements. Other changes are indicated in the figures for power and fuel, due to a more efficient new boiler plant and regrouping of machinery. The projected floor space is reduced through introduction of new handling methods.

#### Estimating Operating Costs

The evaluation of these data by application of unit costs is developed in Table II. For instance, the extension of the estimated labor man-hours for skilled workers at the hourly rates prevailing in the respective locations results in an apparent saving of \$2,000 at site "A," none at site "B." However, much care must be exercised in ascertaining these rates. The availability of labor, its efficiency and stability, is largely determined by the population background—distribution as to male and female workers in the various trades; whether native, foreign born or colored. Again a review of historical trends of rates and attitudes is desirable, wherever the cost of labor is an important item in operating expense. Further factors which must receive consideration in this connection are climatic conditions, housing and living cost, transportation facilities for workers—all having an important bearing on the efficiency and welfare of the workers and to some extent, perhaps, on management personnel.

In a similar manner, the cost of

TABLE II  
ANNUAL OPERATING COST

	Old Location	New Location	
		Site A	Site B
Labor			
Common	\$35,000	\$27,000	\$25,400
Skilled	30,000	27,500	25,000
Superintendence	6,000	5,000	5,500
Raw materials	75,000	72,000	65,000
Fuel	12,000	10,500	8,000
Power	8,000	6,200	6,300
Supplies	6,500	5,400	4,100
Maintenance	18,000	11,700	13,800
Depreciation*	8,500	18,900	22,400
Taxes	27,600	22,500	23,800
Total	\$226,600	\$206,700	\$199,300
Monetary advantage over old location		\$19,900	\$27,300

\*Considered as expense for purposes of comparison.

raw materials, fuel, power and supplies must be established with a view to recognize trends in prices rather than present quotations which may be temporarily distorted. This, of course, is as true of the old location data as it is for the new ones.

Maintenance estimates require careful consideration of the plans for the replacement of obsolete machinery by modern equipment with automatic lubrication, anti-friction bearings and other features which tend to reduce expense. The figures for the annual operating cost in our example reflect the influence of certain changes in layout and equipment, resulting in substantial savings.

Other factors entering this comparison are taxes and depreciation. Annual depreciation charges for the new facilities will vary considerably from those presently incurred, due to

addition of new and elimination of obsolete equipment, the use of different types of building construction or machines. These changes result in a definite increase or decrease in the composite life expectancy. Annual charges must, therefore, be recomputed in detail.

An important item which may be present is continuing charges due to contractual obligations, such as long term leaseholds, unless they are offset by a corresponding income from the unused facilities.

#### Cost of Moving

However, we have so far answered only partly the question: Will it pay to move? The cost of moving, which must be amortized within a reasonable time, in order to justify the relocation, is the offsetting item in our estimate. Its determination is outlined in Table III. This cost may be conveniently classified in three groups:

1. The cost of fixed improvements and new equipment in the new location.
2. The cost of moving present equipment that may be utilized.
3. Indirect costs consisting of various sources of loss—delays in production and temporary decrease in the efficiency of the organization.

Having established the total gross cost of removal, that amount may now be partly offset by whatever sum can be realized from the sale of that portion of the existing plant that is to be abandoned. This would usually comprise the real estate—land and fixed improvements—and machinery and equipment not used in the new plant. The price to be realized must be determined in the same manner as in the fixing of any other market value.

It is obvious, that unless a firm offer at a fixed price is available, the ultimate disposal value must be decreased by deferring its realization (Concluded on advertising page 24)

TABLE IV  
COST OF DISTRIBUTION

	Old Location		New Location			
			Site A		Site B	
	Units	Dollars Per Unit	Units	Dollars Per Unit	Units	Dollars Per Unit
Center "A"—Rail	5,000	5.80	5,000	2.60	5,000	2.60
Center "B"—Rail	5,000	3.30				
—Truck			5,000	0.60	5,000	0.60
Center "C"—Rail			10,000	2.60		
—Water	10,000	1.00			10,000	1.60
Total cost (extended)	\$55,500		\$42,000		\$32,000	
Monetary advantage over old location			\$13,500		\$23,500	

TABLE V  
SUMMARY

Annual Monetary Advantage	At Site "A"	At Site "B"
Operating Cost (Table II)	\$19,900	\$27,300
Distribution cost (Table IV)	13,500	23,500
Total	\$33,400	\$50,800
Cost of Moving (Table III)	\$159,000	\$255,500
Rate of return on additional capital invested	21%	20%
Period required to amortize cost of moving without carrying charges	4 3/4 years	5 years





J. M. HIGHDUCHECK

# MODERN METAL-CUTTING TO

By J. M. HIGHDUCHECK

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that, due to the rapid progress made during recent years in the metal-working industries, it is necessary to recheck equipment, tools, and manufacturing processes, if profits are to be expected.

One of the most unfortunate results of the current business depression has been the development of a peculiar species of pessimists who delight in telling the world that the machining age is responsible for bringing about depressions. A strange lack of faith in the sound structure of American economic life seems to lie back of the pessimism of those who refuse to see anything encouraging ahead. The remarkable industrial development of recent years is the best insurance of continued future growth. Improved machinery has made it possible for the American housewife to own labor-saving devices which, otherwise, would have been impossible. It has made air, water and land transportation fast; it has brought to the homemakers joy and comfort through inventions, such as radio and television. In industry, it has revolutionized old methods and has set a stiff pace for the manufacturers in the field of competition.

Since carbon steel first came into general use, there have been gradual improvements in the method of manufacture, the proportioning of alloys, and the heat treatment. As a result new discoveries were made, and so, step by step, we find carbon steel replaced by Mushet self-hardening steel, then later, Mushet steel replaced by high-speed steel and cobalt high-speed steel. Over a period of 30 years, the progress made in the development of cutting tool steel has been so paramount that it has revolutionized the machining industry, and those who are not familiar with these developments will sooner or later be drawn into the picture of economy of future production, because within the past few years, the increased use of

high manganese steels, heat-treated alloy steels, chilled steel castings, hard bronze and similar metals have presented tasks beyond the normal cutting capacity of high-carbon steel which, apparently, is still used for metal-cutting tools by many manufacturers.

## Keen Interest Now Paid to Tool Investment

In treating a subject, such as the art of manufacturing cutting tools, using the conventional grades of high-speed steel, and the newly developed super-high-speed steel grades, it is interesting to know where and when these grades can be used to the best advantage. Since we are dealing with the question of removing metal at the highest possible rate of speed and feed and in producing in the least possible time, it is only natural in this highly competitive age that keen interest must be paid to tool investment. In large shops where many cutting tools are used, operators accumulate thousands of tools, resulting in a large tool steel investment. Incentive production encourages this accumulation because an operator, upon receiving a new job, often is compelled to grind a tool to machine the job. If this work becomes standard, being repeated from time to time, he holds the tool in the shape found most effective. This is a typical situation in a large shop. Therefore, by organizing a forged tool control and by economical manufacture of such tools, it is possible to give impetus to incentive production and at the same time lower manufacturing costs.

## Cost Lowered by Tipping Tools

Experience shows that cutting tools are expensive, especially those forged from solid high-speed steel. Fig. 1 shows a set-up in which four 2 in. x 2 in. x 9 in. long solid high-speed steel tools were used in roughing down a cast-steel spider. The piece of steel

**T**HE ever increasing uses of steel in all industries and the necessity of securing the best results with the material used make a knowledge of the proper working of steel more important than ever before. For it is not alone the quality of the steel itself or the alloys in its composition, but the proper working or treatment of the steel which determines whether or not the best possible use has been made of it. The world-wide superiority of American production methods is based on a low labor cost made possible by the development of more efficient machines and tools. In this development, the metallurgist has played a leading part, and history shows that lower production cost is brought about by the introduction, first, of a new cutting tool, and secondly, by the development of improved machinery that utilizes the tool to the best advantage.

Developments during the past three years serve to emphasize the fact that metal-cutting tools in all of their diversified branches have become one of the most interesting subjects of the present machining age. Since the introduction of cemented tungsten carbide for metal-removing purposes, the machining public has come to realize that King Ruler, namely, "competition" has again called a round-table conference, this time to tell the machining public



# G TOOLS

weighed 11½ lb. before being forged into a tool. At a cost of 65c. a pound, the steel in each tool cost \$7.47. The forging and grinding labor added \$3.20 more, making the total cost of each tool \$10.67, or \$42.68 for the four roughing tools.

To reduce the tool cost on a job which was highly competitive was a problem. The question of reducing the size of the tool was impractical. Running at a surface speed of 50 ft. per min., with a 3/32-in. feed (two tools cutting) and ¾ to ½ in. depth of cut, a tool of heavy cross-section was necessary. To reduce the tool cost, it was agreed to use a tipped tool identical in shape with the forged tool, except tipped as shown in Fig. 2. The shank material weighed 11 lb. At 20 cents a pound, the cost was \$2.20. Drop forging of the recess, the high-speed steel tip, and the brazing of the tip, plus the hardening and grinding, amounts to \$3.80, or \$24 for four tools, netting a saving of \$18.68 on the set-up.

## Tipped Tools Not Always the Cure

Tipped tools are not always the cure when high tool cost exists; in fact, 40 per cent of the cure lies in the selection of proper brands of cut-

WIDER use of harder and tougher steels, development of new tool materials, and advances in machine tool design are again necessitating close scrutiny of cutting tools, which, as is well known, have a basic influence on shop efficiency and costs. In view of this, Mr. Highducheck's discussion of the manufacture and control of forged steel cutting tools is timely.

ting steels and proper heat treatment. It has often been said that no tool is better than the heat treatment it receives, and if the supplier has responsible melting furnace experts and honest hammer-men, then generally the trouble due to failure can be traced to poor heat treatment.

High-speed steel is one of the most complex alloys known. The performance of any grade of high-speed steel can be determined only by test. It is true that there are brands which give better performance than others, and yet their chemical composition is the same. Again, certain machining applications require a steel which is tough. Other applications require a steel which is very hard, and still other applications require a tough and hard steel. In a large plant where some 30,000 forged tools are manufactured each year, it is very

hard to select tool steel for every application. Therefore, a set-up classifying the standard lot of tools was made and in Fig. 4 is shown the standard shapes and their classifications.

## Forged Tool Standards Established

Under caption "Class A" are forged tools for all types of machines which are used as threading, parting, facing and copper turning. These tools are made solid, and the steel used is called high-tungsten chromium steel, containing 0.70 per cent of carbon, 4.0 per cent of chromium, 1.0 per cent of vanadium, and 18 per cent of tungsten. This steel is the easiest to harden of all the different brands of high-speed steel on the market. Tools made from this grade give satisfactory service when used under normal conditions, regardless of the type of material being machined. They should be made solid. If heavy cross-section tools are needed, they can be tipped by special permission using the same brand of steel.

Under caption "Class B" are forged tools generally recognized as finishing, facing, radius and forming tools. These tools can be made tipped, using the same cutting steel as in Class A. The shank material is a carbon steel containing 0.55 per cent carbon, 0.75 per cent manganese, 0.04 per cent phosphorus, 0.15 per cent silicon. This steel is a hot-rolled carbon steel and is highly recommended for tool shanks to which high-speed steel and cobalt tips are welded. Not all forged tools should be tipped. There are sizes which would be expensive to tip and impractical. Experience shows that best results are obtained when tipped tools are made having a cross section of ¾ x 1¼ in., 1 x 2 in., 1¼ x 1¼ in., and 1½ x 1½ in., etc. Tools having a cross section ¾ x 1¼ in., ½ x 1 in., 1 x 1 in., ¾ x ¾ in. should be made solid. The high-speed tip thickness should be about 60 per cent of the thickness of the shank height and width. As a rule, it is not practical to use tipped tools where long overhang exists. Not because of the danger of the tip coming off, but because such applications cause excessive vibration on the cutting edge, and the mechanical strength of the shank being much lower than a solid hardened tool, the tool will bend under the pressure thus breaking down the cutting edge. It is recommended that such tools should be considered solid steel and generally from grades which are tough rather than hard.

In the last three or four years cobalt steel has become popular. There

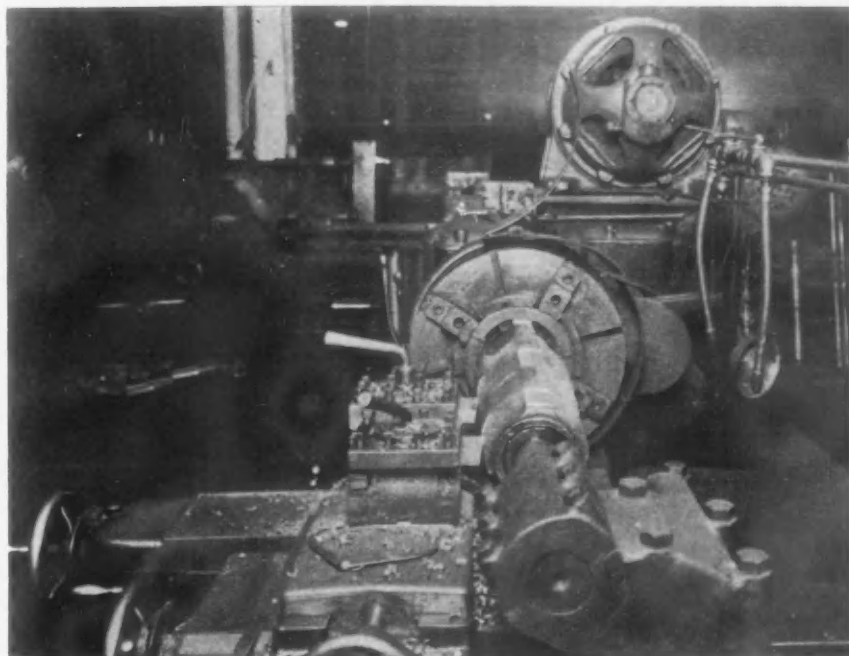


Fig. 1.—Solid high-speed steel tools replaced by tipped tools resulted in savings of approximately 50 per cent in tool cost.

ITEM 1: AS SHOWN ON DWG WS 3052  
 INFORMATION FOR DRIVING OF TIP: SEE DWG WS 3052  
 MATERIAL TO BE MACHINED: STEEL  
 FOR STANDARD TOOL SHAPES SEE DRAWING WS 3058  
 FOR CUTTING SPEEDS SEE DRAWING WS 3050  
 ALL DIMENSIONS ARE IN INCHES  
 R DENOTES FINISH  
 FRACTIONAL DIMENSIONS: 1/64  
 G DENOTES GRIND  
 CLEARANCE ANGLE

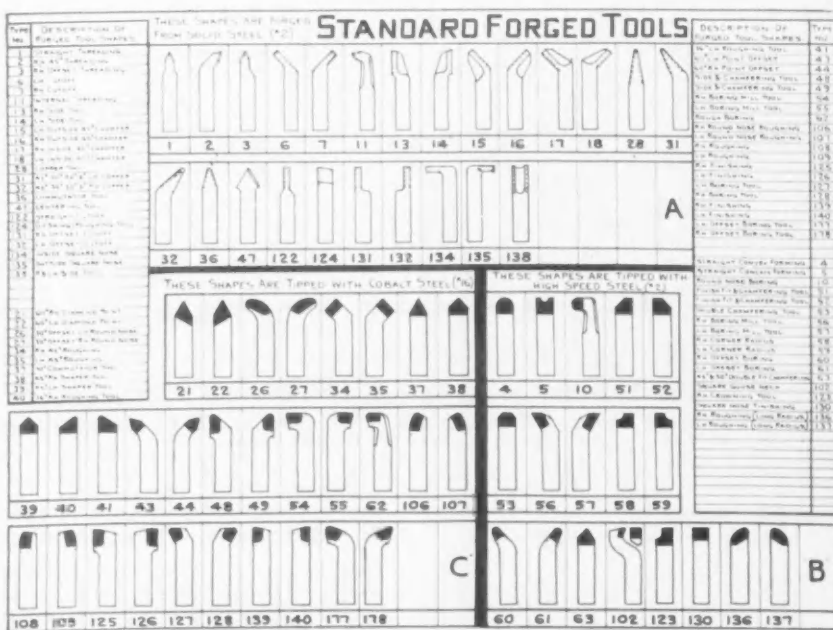
**BILL OF MATERIAL**

ITEM	QTY	SIZE	W	HT	REQ	COMP UNIT (ITEM NO)	STOCK (ITEM NO)
1	TIP	1" x 1" x 1/8" LG	16-TS				
2	SHANK	2" x 2" x 20" LG	1-TS	1	1 AND 2	6658.20	
3	SHANK	2" x 2" x 16" LG	1-TS	1	1 AND 3	6658.12	
4	SHANK	2" x 2" x 12" LG	1-TS	1	1 AND 4	6658.12	

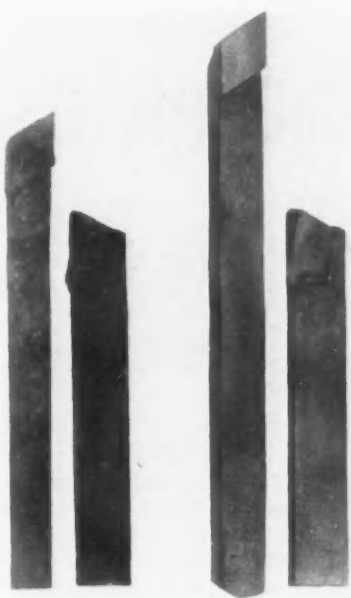
before

by a blast of compressed air, the air should be dry free from moisture. Cobalt steel used properly, is very profitable, and economical. Speeds can be increased 15 to 30 per cent, depending on the kind of material being cut. In a recent test a high-speed steel tipped tool removed 6.7 cu. in. of material a minute, while the cobalt tipped tools removed 9.1 cu. in. a minute. The steel machined was S.A.E. 1035; the cross section of the tool was 1 x 2 in. Cobalt steel tools are more profitable in applications where heavy cutting exists. The application illustrated in Fig. 1 was tried out with cobalt tipped tools.

It must be remembered, however, that best results can only be obtained from cobalt tipped tools when properly designed and manufactured (see Fig. 5). Design the cutting tool so that the tip can be used in virgin form, or, in other words, avoid forging into the desired shape. Grinding after hardening is much better than forging, especially in cobalt steel because tools made from this material must be ground on all cutting edges on account of the deep soft skin pro-



are co



before and after brazing.

duced in hardening. High speed and cobalt tips are brazed into position by a compound which consists of manganese, silicon, and high-speed steel filings, using borax for a flux, all of which are mixed together and are in powder form for use.

The hardening process of high cobalt steel requires a slow preheat before hardening treatment. After the material is thoroughly preheated at about 1500 deg. F., it should be transferred to the heat furnace and brought quickly to the hardening heat, 2300 to 2400 deg. F., depending on the brand, brazing the tip at the

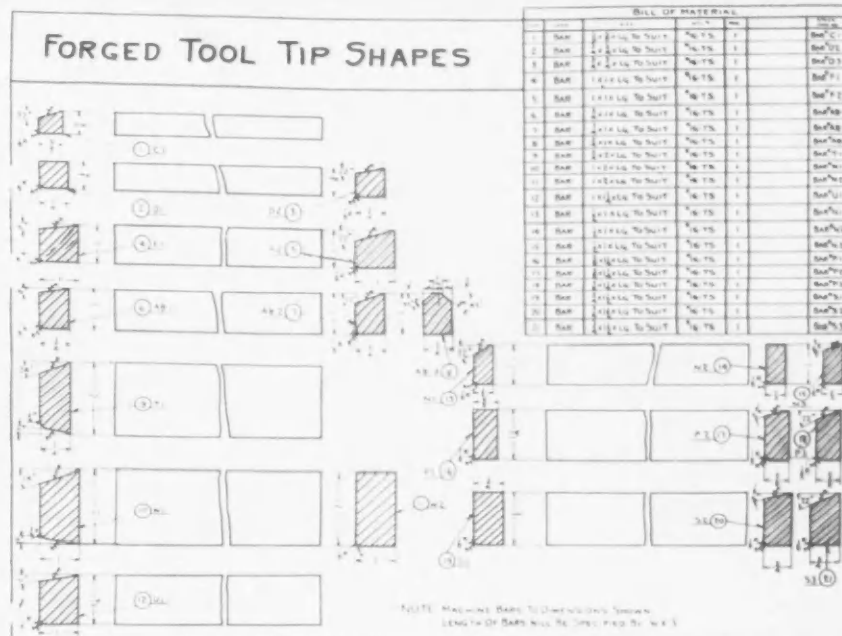


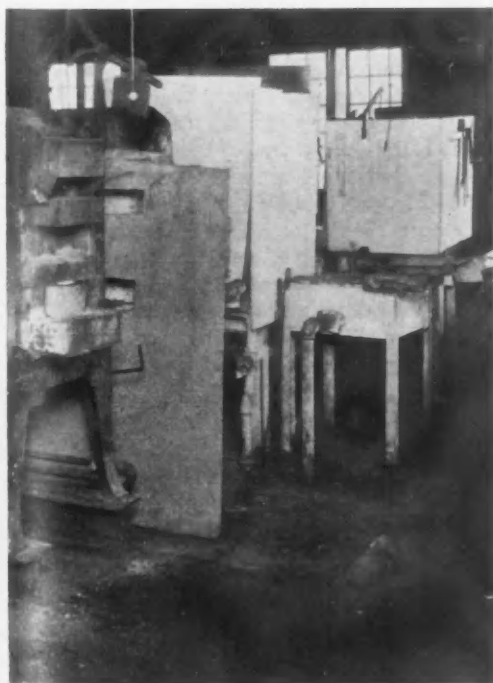
Fig. 5.—Working drawing to which cobalt steel bars are machined before being cut up into tips.

same time. Note:—Place the powder into the tip recess before placing the tip in the recess, then cover the tip with the powdered compound and place the tool for the 1500 deg. F. preheat. After bringing to hardening heat, place tool under an arbor press (see Fig. 6) and by carefully pressing the cobalt steel tip into position until cool enough to set the braze, allow the tool to cool in the air to about 200 to 225 deg. F., and draw immediately to 1050 to 1100 deg. F. Hold for at least two hours after the tool has become uniformly heated through. Cool slowly and uniformly in air or furnace. Hardened tools should have a minimum Rockwell C hardness of 63.

Cobalt high-speed steel tools have proved superior to high-speed steel tools in general roughing work. There are hundreds of applications throughout the Westinghouse plant operating successfully for the past three years.

Although it has been suggested before, it is appropriate perhaps to repeat that machine-tool builders should allow more depth between the available distance usually permissible in the tool-holding devices, between the tool-base and the tip.

Machine tool buyers of today are beginning to look for machines with plenty of height between the top of the tool rest and the center of the machine, so heavier stock can be used.



are controlled closely by electrical heat instruments.

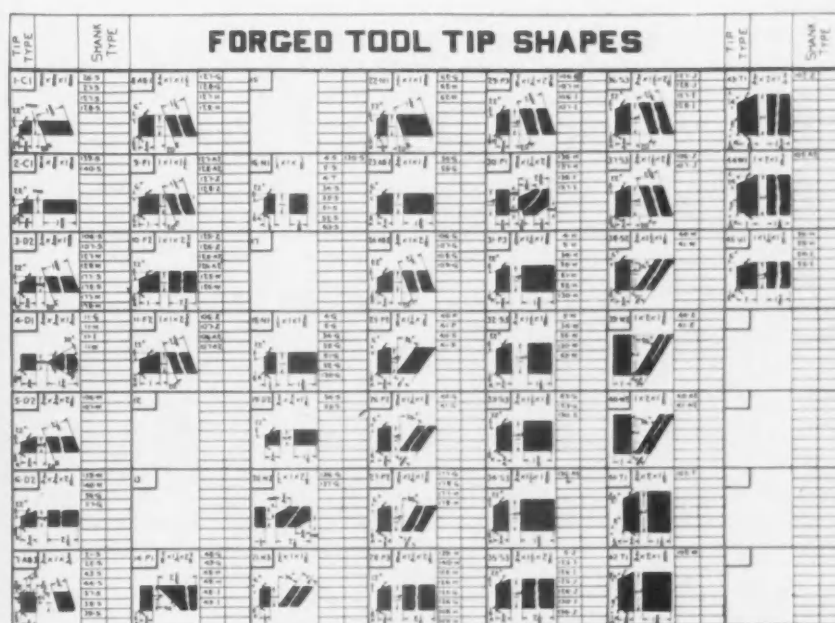


Fig. 6.—Working drawing giving the dimensions of the different tips which compose the standard shapes shown in Fig. 4.

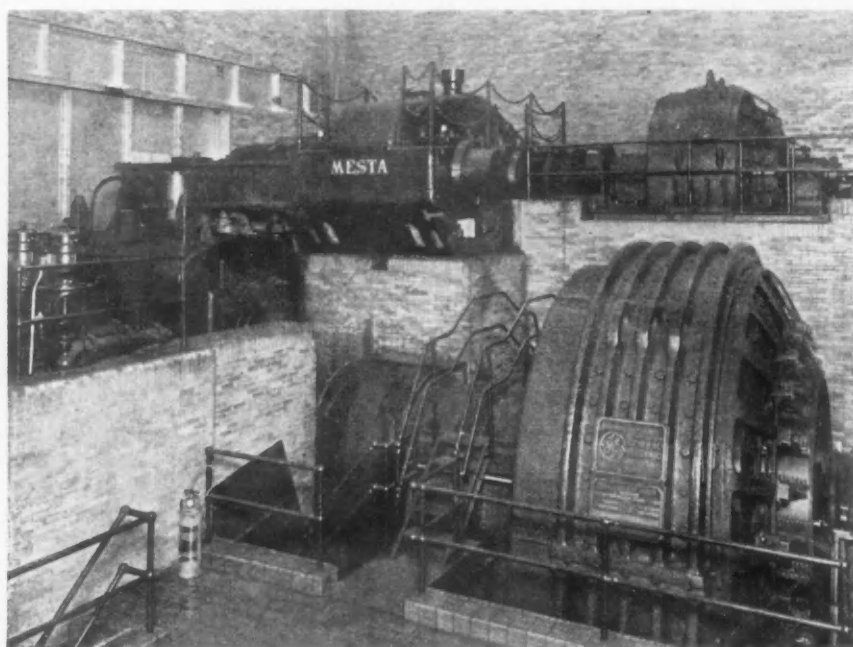


**E**LECTRIC motor drives for rolling mills are now such a matter of course that only an outstanding installation is worthy of description. Of such a nature is the electrical equipment of the slabbing and wide hot-strip mills in the Steubenville (Ohio) plant of the Wheeling Steel Corp.

A word as to the mills themselves may be of interest. The 45-in. slabbing mill is of the reversing universal type with one pair of horizontal rolls and one pair of vertical rolls. This mill receives ingots from the soaking pits and rolls them into slabs for delivery to the reheating furnaces, or direct to the strip mill. Some of the heavier gages of strip and plate are finished in the hot strip mill direct from the ingot heat, but for thinner gages the slabs are reheated.

The strip mill has eleven stands of horizontal rolls and three vertical edgers. The first two stands are of two-high construction, while the remainder are four-high, with the backing-up rolls supported in roller bearings. The edging rolls are located at stands 3, 4, and 5, just ahead of the horizontal rolls. The mill produces wide strip in both light and heavy gages, and also thin plate and skelp.

The strip leaving the continuous mill may either be cut to length by a Mesta rotary flying shear, or delivered to either one of two Mesta coilers. The hot sheared strip may be cut into finished lengths in a cold flying shear or a plate shear, and passed through a leveler. After inspection it is ready for shipment.



7000-hp. and 1650-hp. reversing motors drive horizontal and vertical rolls of universal reversing slabbing mill.

# ELECTRICAL EQUIPMENT

## STRIP MILL AT ST

By HARRY A. WINNE

Industrial Engineering Department,  
General Electric Co.

The coiled strip may pass on to the cold strip mill for further processing.

The horizontal rolls of the slabbing mill are driven by a reversing motor rated 7000 hp., 50 to 100 r.p.m., 750 volts. This motor is capable of delivering a maximum torque of 2,000,000 lb.-ft. It is direct connected to the mill pinions. The vertical rolls are separately driven by a reversing motor rated 1650 hp., 112.5 to 270 r.p.m., 750 volts. This motor is connected through a reduction gear to the shaft of the bevel gears which drive the vertical rolls.

### The Slabbing Mill

As there is no mechanical tie between the two motors, the control had to be arranged so that the ratio of speeds of the two drives would at all times be correct. The gear ratio between the 1650-hp. motor and the vertical rolls is such that when all

rolls are of the "nominal" diameter, the surface speeds of both sets of rolls will be the same when the horizontal roll motor is running at 50 r.p.m. and the vertical roll motor at 112.5. However, it is obvious that as the rolls wear and are turned down the ratio of diameters may vary, requiring a different ratio of motor speeds. Furthermore, due to the difference in entering and delivery speeds caused by the draft taken in the horizontal rolls, a higher vertical roll speed is required when the steel is traveling through the mill from the horizontal toward the vertical rolls, than for the opposite direction.

The control accomplishes all these results. Changes in roll diameter are compensated for by simply adjusting a rheostat, and the difference in speed for different directions of travel is obtained automatically. The mill operator controls the direction and speed of rotation of both motors simultaneously by means of a foot operated master switch having two pedals. Depressing either pedal starts the motors in the forward or reverse direction, and the speed depends on the amount the pedal is depressed. So far as the roller is concerned the operation is as simple as that of an ordinary blooming mill.

Power for the slabbing mill motors is supplied by a flywheel motor-generator consisting of three 2400-kw. (750-volt—400 r.p.m.) generators, a 5000-hp. 6600 volt induction motor, and a flywheel having a stored energy of 160,000 horsepower-seconds at full speed. It is believed that this is the first time in reversing mill service that three generators have been operated with their armatures connected in parallel. A system of cross connected series fields maintains equal

# OF WHEELING'S WIDE STEUBENVILLE

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**U**NIVERSAL reversing 45-in. slabbing mill has automatic means to secure the same surface speeds for the horizontal and vertical rolls. Three 2400-kw. generators of the flywheel motor-generator set for the slabbing mill are connected in parallel with field controls to distribute the load equably.

To help in keeping the strip to gage, there are three push buttons on each strip mill housing, to permit the operator to jog either screw of the screw-down or both screws simultaneously.

Special construction features the motor room because it lies below the level of high flood waters, and equipment for ventilation is accordingly unusual.

Included in the article are power consumption figures per ton of product for low-tonnage operation.

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division of load among the three machines at all times.

## Strip Mill Has 25,650 Hp. in Main Motors

**T**HE wide strip mill is the most highly powered continuous mill at present in operation. The total continuous capacity of the main driving motors on this mill is 25,650 hp. As previously mentioned, the mill has eleven horizontal stands. The first two are driven through a tandem

double-reduction gear from a single motor. The remaining nine stands are driven by individual motors, all geared. On stands 3, 4, and 5, double reductions are used, while the remaining stands have single reduction gear units. The horsepower and

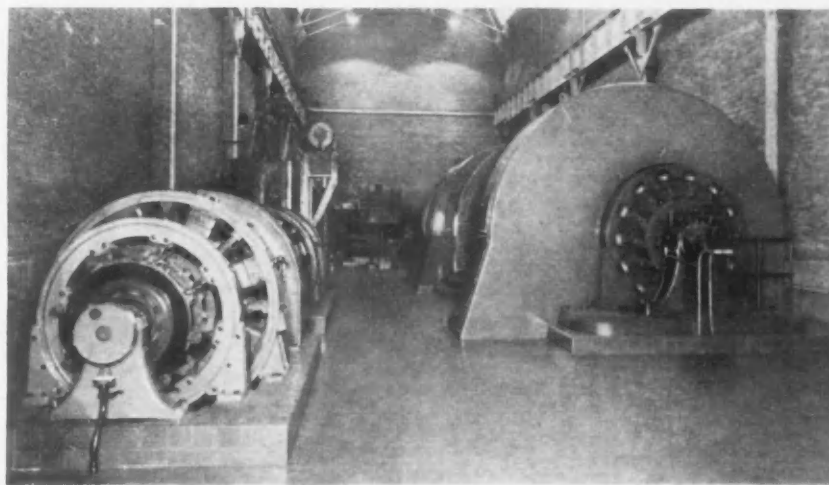
speed ratings of the motors on the various stands are as given in the accompanying tabulation.

Each edging stand is driven by a 150-hp. (450/1200 r.p.m.), totally enclosed, separately ventilated motor of mill type construction mounted directly on the mill housing.

All of the horizontal roll motors are open, self-ventilated machines, of heavy mill type construction, capable of carrying maximum loads of 200 per cent of their normal ratings. Each has a centrifugal switch to protect against overspeed thermostatic relays in the bearings to warn of high bearing temperature, tachometer, and electric heaters to prevent "sweating" when shut down.

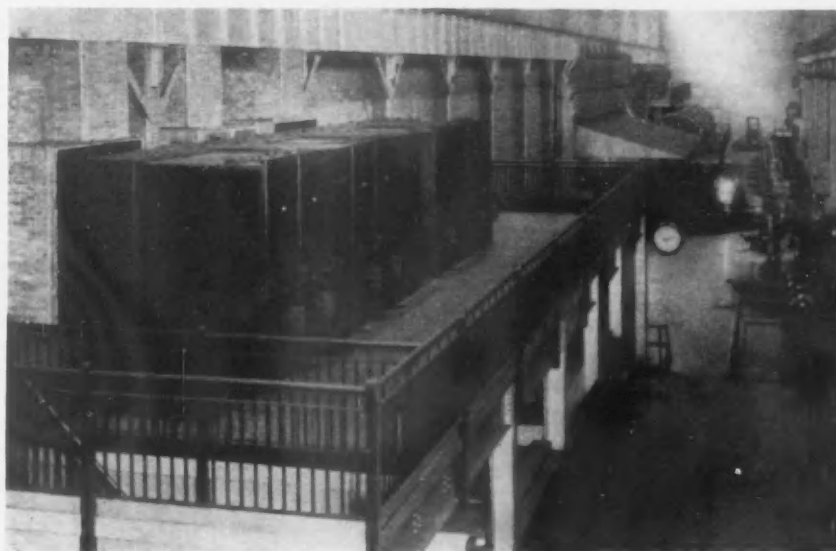
All of the horizontal roll motors operate at 600 volts, this power being supplied by three 4000-kw., 3-unit, synchronous, motor-generator sets.

The arrangement of the connections is such that all motors and



Toward one end of motor room are 7200-kw. flywheel set and two 1000-kw. 250-volt motor-generator sets. The large d.c. generators have ventilating housings.

The other end of motor room contains the driving motors for the strip mill. Truck-type oil circuit breakers are mounted in gallery at the left.



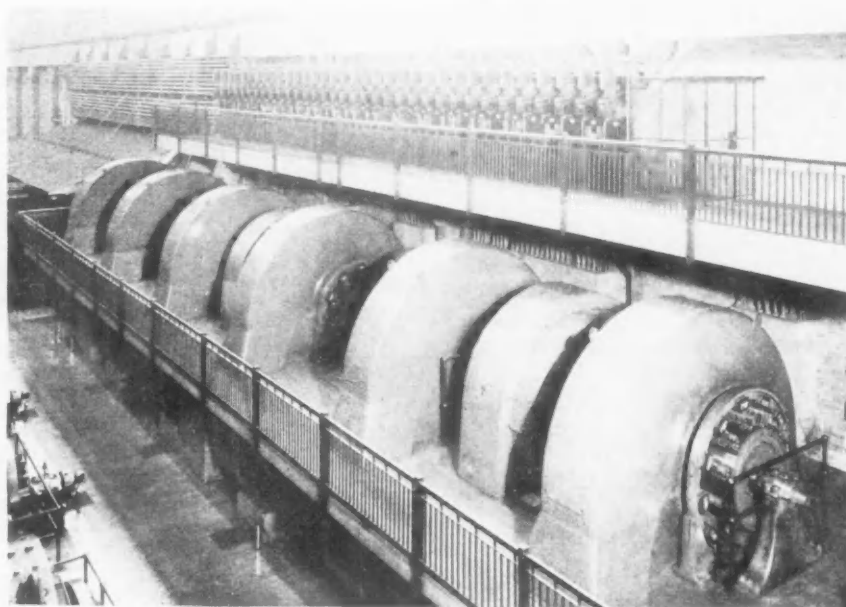
Stands	Motor Horsepower	Motor Speed, r.p.m.
1-2	4000	300/400
3	3000	200/400
4	1200	250/500
5	1200	250/500
6	1500	220/440
7	2300	200/400
8	3000	200/400
9	3000	200/400
10	3000	200/400
11	3000	200/400

generators may be operated on the same bus, or one 4000-kw. set and the motors on the first three stands may be segregated from the rest. The reason for this arrangement is that when operating at normal motor speeds, the first three stands of the mill deliver strip at about three times the normal entering speed on stand 4.

indicating instruments showing the load and speed of each motor, and control switches and levers for starting the mill and controlling the motor speeds. The mill motors are started by building up the generator voltage, thus eliminating the necessity for expensive magnetic control and accelerating resistors. The pulpit op-

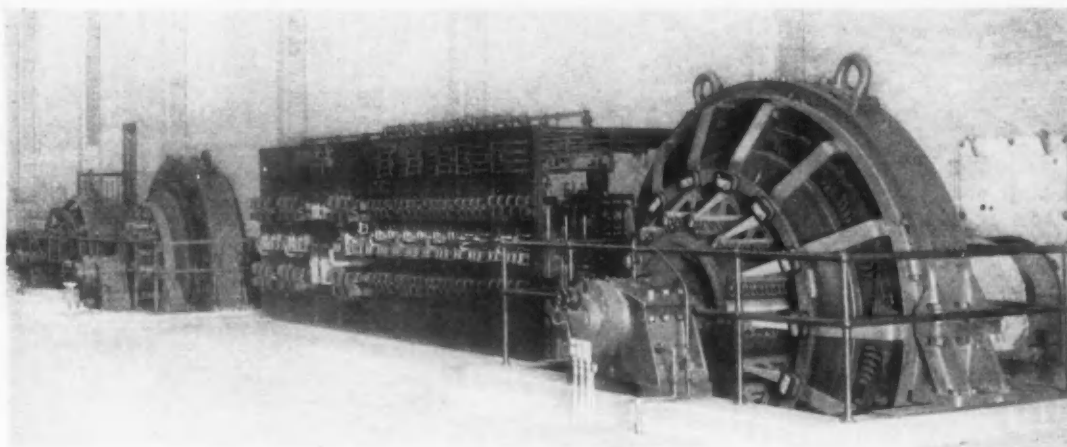
control is arranged so that one operation of the push button gives a predetermined amount of travel of the screw. A master switch is also provided which is used for making major adjustments of the screws.

The looper rollers, which are located between adjacent stands of the strip mill from No. 5 on, are motor operated. Each looper roller is supported in bearings on two levers which are connected to a shaft, which is in turn geared to a mill type d-c motor. This motor operates as a torque motor, making only a few turns for the complete up and down travel of the looper roll. These looper motors may be controlled manually from master switches located in the pulpit, or automatically by relays actuated by the loads on the main driving motors. These relays are arranged so that when there is strip in both of two adjacent stands, the load on the corresponding two driving motors will cause the relays to function and this in turn causes the looper motor to be energized and to raise the looper roller until the strip is stretched taut between the two stands or until the roller reaches the upper limit of its travel. As soon as the strip leaves



THREE 4000 - kw., 6600 - volt a-c., 600-volt d-c. motor-generators, located on a balcony, supply power to the strip mill drives. Special ventilating housings cover the generators.

4000-hp., 3000-hp. and 1200-hp. direct current motors drive the first four stands of the wide strip mill.



When rolling from short slabs, the slab clears stand 3 before entering stand 4 so that this overfeeding is satisfactory. However, when rolling from long slabs, the metal must be continuous in stands 3 and 4, and it is, therefore, necessary to reduce the speeds of the first three stands considerably below their normal value. To accomplish this these motors and the one generator set are segregated from the rest and operated at reduced voltage which gives reduced motor speed.

The operation of the mill driving motors is controlled from the mill pulpit. The operator in this pulpit has on a steel desk in front of him

erator can also reverse the entire mill to back out a cobbler.

Some of the strip mill auxiliaries are of considerable interest. The 4-high mill screwdowns are motor operated. Interposed between the screwdown motor and the gear on each screw is a magnetic clutch so that the motor may be connected to either screw alone or to both screws simultaneously. Thus, if the strip gage is not the same on each edge, one or the other screw can be adjusted to make it uniform. Located on each mill housing there are three push button stations, which permit the operator to jog either screw alone, or both screws simultaneously. The

one of the stands the roller automatically returns to its lower position.

#### Motor Room Is Below High Flood Water

THE main driving motors and motor-generator sets for the slabbing and strip mills are located in a single motor room, approximately 561 ft. long and only 40 ft. wide. This room also houses a Nordberg una-flow steam engine, which drives a 19-in. continuous skelp mill.

In the layout of this motor room many unique problems had to be solved. The elevation of the main floor on which the strip mill motors



are located is approximately 2.5 ft. below the maximum recorded flood stage of the Ohio River. Therefore, great precaution was taken to prevent the possibility of flooding the motor room and basement beneath it. The basement floor and side walls and the walls of the motor room are of water tight construction to a point above maximum flood level except where the motor shafts pass through the wall. At these points special steel casings were set into the concrete walls, arranged so that water tight packing may quickly be put in place between the shaft and the casing. Automatically controlled pumps connecting to a sump in the basement are also provided.

Because of the narrowness of the motor room it was necessary to place the 4000-kw. motor-generators on a gallery, as shown in one of the illustrations. Incidentally, this brings these machines above the possibility of harm in case of flood. All switchgear was also located above maximum flood level.

In order to get rid of the heat liberated in the motor room (with its 68,000 kw. in electrical equipment) ample ventilation has been provided. In an underground chamber near the north end of the basement, there are located four 60,000 cu. ft. a min. fans which draw air in through oil-film type filters, and discharge it into the north basement from which it passes up through the machines into the motor room.

In the south basement, which is separated from the north by the engine foundations, are located four additional 60,000-c.f.m. fans and a filter. The air supplied to these is



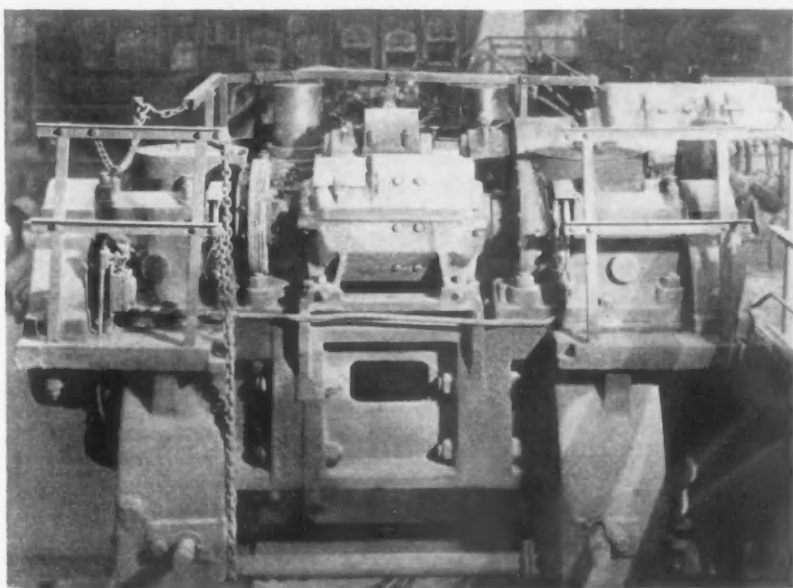
**I**n the motor room basement can be seen one of the 60,000 cu. ft. a min. fans, together with a part of the air filter.

from a duct leading through the roof.

It is evident in one of the illustrations that a novel method of ventilating the generators of the 4000-kw. motor-generator sets has been employed. Housings of the general shape of a fan casing enclose the magnet frames in such a way that the air drawn into the machine by the fan action of the rotating armature is discharged into this casing and led outside of the motor room. This results in very efficient ventilation of the machines and prevents the heat being liberated in the motor room itself.

The power consumption of the main drive on the slabbing mill, including all losses in motor-generator sets and exciters, during a period of six months of rather low tonnage operation has averaged 19.65 kwhr. a gross ton of sheared slabs. On the strip mill the power consumption over the same period averaged 61.68 kwhr. a ton. The auxiliaries, including cranes and lighting, consumed 15.61 kwhr. a ton for the slabbing mill, and 27.24 kwhr. a ton on the strip mill.

The slabbing and strip mills and auxiliary equipment were designed and built by the Mesta Machine Co., Pittsburgh. The electrical equipment and steel work in the outdoor transformer sub-station, the main mill driving motors, motor-generators, switchgear and control, and the majority of the auxiliary drives and control, with the exception of resistors, were supplied by the General Electric Co. The Westinghouse Electric & Mfg. Co. furnished the drives for the flying shears and the resistors for the majority of the auxiliary control.



Screwdown drive, on one of the hot strip mill stands, has a 50-hp. motor connected to the two screws through magnetic clutches.

An unusual type of normalizing furnace built last year in Scotland was reported by James Bryden, Smith & McLean, Ltd., Glasgow, in a paper read before the West of Scotland Iron and Steel Institute. The furnace is of the vertical type and the sheets are carried through suspended from a conveying rod. The sheets hang in the same manner as clothes on a clothes line.

# Control of the Gases Occurring in Steel

By HENRY D. HIBBARD

Consulting Metallurgical Engineer, Plainfield, N. J.

HAVING identified and measured the various gases and determined their uses, as well as the kind and degree of harm each works, the problems will become: First, how to minimize the quantity of each harmful gas entering the metal; second, how to eliminate, at the proper time, from the metal all such gases as completely as practicable; and, third, how best to suppress or render harmless within permissible limits those persisting in the metal.

In common practice the first receives only incidental attention, if any. The second is accomplished to some extent by the boil, time, control of temperature and presence in or absence from the metal of gas solvents. For the third, if the steel is to be killed, the only known way is to overwhelm the gases with added solvents, which indeed covers or cures, in a way, neglect of the first two as well. Much light is needed, especially on the first two. In making rimming steel the strong evolution of gases in the mold must be established.

Methods for dealing with gases in the metal to minimize the harm they do to the product may be either chemical, physical or mechanical.

## Chemical Means

Using chemical means includes, first, melting so as to absorb as little gas as possible, for which the scrap should be exposed to the flame as brief a period as practicable, as, presumably, the bare melting stock absorbs hydrogen, nitrogen and oxygen, as it is known to take up sulphur. The hydrogen and a part of the oxygen come from the decomposition of water vapor and the remainder of the oxygen from the excess of air introduced to burn the fuel. The oxygen forms an oxide, most of which enters the slag, while the hydrogen set free is more or less freely absorbed by the metal. Scrap submerged in the bath absorbs no gases.

Chemical means also includes oxidation of carbon at such a rate, and hence with such a boil of the bath, that the metal at the end will have no more than manageable quantities of gases, particularly of hydrogen.

It is possible in many cases to control the evolution of gases in steel so that they will work a minimum of harm. Some of the means—physical, chemical and mechanical—by which they may be rendered innocuous are here briefly outlined. Three gases are listed as unavoidable: carbon monoxide, hydrogen and nitrogen. The first is useful, the second harmful and the third a hardener of the steel. This is the concluding section of five installments on the subject of gases in steel.

To limit absorption of hydrogen by the metal, and perhaps also to keep down oxidation of iron, it is well to minimize the amount of water vapor entering the furnace or converter. To this end it may be important that air and not steam be used to atomize liquid fuel or to blow producer fires. In the latter, water vapor will be more or less completely decomposed in the producer fire, its oxygen combining with carbon and its hydrogen being set free.

Further, on rainy days, when humidity in the air is high, a stronger boil, or greater quantity of boil, may be required to promote the escape of hydrogen from the metal. This would call for more crude iron in the charge in wet weather, which would add more carbon, call for more ore to oxidize the carbon and thus give a greater volume of carbon monoxide to be boiled out, which would carry off proportionately more hydrogen.

## Physical Means

Means called physical comprise stirring to expel gases from the metal and the solution of gases by solvents, usually silicon or titanium or aluminum, one or more. If the steel is to be partly or wholly killed, the more stirring of the bath near the end to dislodge gases the better,

within limits. If rimming steel is being made, stirring should be limited to a few strokes with one rod just before taking a sample, merely to make the bath metal reasonably homogeneous, and not enough to dislodge too much of the gases, which may be needed to give a proper action in the mold.

## Mechanical Means

Baraduc - Muller's investigations show that hydrogen and other gases may be extracted in great volume by suction from low-carbon steel, not killed, but the method does not seem to be practicable or commercial, at least at present.

In a partly killed steel ingot the greater soundness of the lower part, that is, relative freedom from gas holes, compared with the upper part, is due presumably to pressure of the steel above, as noted. That indicates that pressure above atmospheric during solidification would tend to keep the gases or some of them more completely in solution and so give sounder steel. Means for applying such increased pressure have been proposed and tried by several experimenters, but not adopted in a practical way. Trying to correct a chemical ill by mechanical means is inherently unsound.

A tabulation of the published analyses of gases derived from steel would have little value, because no two samples have been similar in any of their antecedents, and no sufficient histories are given to induce one to attempt their interpretation.

In trying to trace the effects of some alloy or ingredient of steel one wants to know, among other things, what its effect is on the gases which appear at the different stages of its manufacture.

## Conclusions

In ending one may say that, in making steel, carbon monoxide is unavoidable but useful. Hydrogen is unavoidable and harmful. Nitrogen is probably unavoidable and a hardener. The other gases, CO<sub>2</sub>, CH<sub>4</sub>, and perhaps others, are accidental and in small quantities. Their effects, if any, are small and perhaps negligible.

# State Trade Barriers Create New Problem for Industry

By T. H. GERKEN  
Pittsburgh Editor, The Iron Age

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A DESIRE to produce business for local industries during the last two years has developed a series of back-fence trade wars between the various States which promises to have serious consequences if unchecked. The practice goes back more than a century and a half to the time when the various colonies built tariff walls to protect their local industries, but disappeared with the formation of the Union, and was apparently settled forever in 1824 when Chief Justice Marshall, of the United States Supreme Court, handed down his decision in the case of *Gibbons vs. Ogden*, which established the authority of the Federal Government over commerce among States and recognized that business which is national should be under national rather than State control.

Most of the recent moves toward localization of trade apply only to State purchases of materials for public works, although the Wisconsin Legislature went even further, when, in an effort to protect the State's butter producers, it recently enacted a law placing a high tax on the sale of butter substitutes within the State. Little effort was made to conceal the fact that this was not a revenue measure. A recent survey indicates that, while a large number of States have passed resolutions to the effect that preference be given to goods produced, grown or manufactured within the home State at equal price and quality, the purchase of home-produced materials when possible is not compulsory except in Kansas, Minnesota, Missouri, North Dakota, Oklahoma and Wisconsin. Colorado and Wyoming have passed laws requiring that preference shall be given to materials produced within the State on all State work, and that a premium of not to exceed 5 per cent may be paid for such materials as against competition from other States. A similar law

THE trend toward economic isolation is not confined to countries. Notwithstanding that our basic law bans tariff walls between States, legislation in various parts of the nation has given preferences to home products that have the same effect as duties. In most cases the laws cover public purchases only, although Wisconsin has gone further, giving protection to its butter industry by imposing a high tax on butter substitutes. Certain States not only direct that preference be given to home-produced materials in making public purchases, but authorize the payment of a premium of 5 per cent over the prices of competing products from other States.

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was passed in North Dakota to affect the erection of the new State capitol building.

## Retaliation Is Encouraged

While most of the States have taken no official action with regard to such practices by other erstwhile friendly neighbors, the Pennsylvania Legislature recently passed a law providing that "it shall be unlawful for any administrative department, board, or commission to specify for or permit to be used in or on any public building or other work erected, constructed, or repaired at the expense of the Commonwealth, or to purchase any supplies, equipment, or materials

manufactured in any State which prohibits the specification for or use in or on its public buildings or other works or the purchase of supplies, equipment, or materials not manufactured in such State."

This action by Pennsylvania is possibly a forerunner of what other States will be forced to do if their neighbors continue to enact legislation which serves to restrict the free movement of interstate commerce.

In justice to the restrictive laws enacted by the above-mentioned States, it must be admitted that price is still an important factor. The laws of Kansas, for instance, provide that "all supplies and materials for certain public institutions in this State, when such supplies and materials are produced within the State of Kansas, must be purchased from persons, firms or corporations within the State of Kansas whenever the same can be purchased at a price equal to the price submitted by anyone else."

In Minnesota the law rules that "in purchasing supplies preference shall be given to Minnesota dealers when it can be done without loss to the State." With regard to the construction of buildings by the State, or to the erection of which the State has granted aid, the statute provides that preference shall always be given to materials produced or manufactured in the State of Minnesota, by citizens or residents thereof, wherever practicable. Apparently as a protectory measure, a section of the law provides that the above-mentioned statutes shall not apply in any cases where, in the judgment of the various State authorities vested with the power of contracting for the buildings referred to, it appears that an attempt is being made by producers or manufacturers in this State to form a pool, trust or combination of any kind for

(Concluded on page 1051)







# Welding Engineers D

**W**IDENING application of welding and progress in technique were again reflected in the proceedings of the annual meeting of the American Welding Society, held at the Engineering Societies Building, New York, April 27-29.

The meeting comprised five technical sessions at which some 23 papers were presented. Features included a symposium on ductility in welds and a session on shipbuilding. Welding as applied to steel barges, household refrigerator parts, high and low-pressure piping, wrought iron, and extruded bronze, and the spot welding of stainless steel were some of the more important topics discussed. Intergranular corrosion in austenitic steels and a study of transformation points in weld metal were two metallurgical subjects considered. Some sessions discussed processes, including late developments in gas welding and details of spot and projection welding.

As heretofore, the convention was followed by the annual meeting of the American Bureau of Welding, the research department of the society. Outstanding at this meeting was the announcement of the completion of a tentative specification by the welding wire specification committee, a labor of some seven years; the final draft of the welded rail joint report; and the proposal of a supplementary structural steel welding investigation.

## What Ductility Should a Weld Have?

**A**DUCTILITY in the deposited metal of 10 per cent is too low for safety in many structures and a ductility of 15 per cent may be too high for other structures. Yet there is not enough definite data to make a positive statement about either of these, according to several of the speakers at the lively symposium on ductility held Thursday afternoon.

The first paper, by Prof. C. A. Adams, Harvard University, Cambridge, Mass., pointed out many of the difficulties in actually describing or defining ductility. If you take a standard test bar of ductile material showing elongation in 2 in. of 30 per cent and then take this same bar and drill a number of holes so as to remove one-half of the cross section and subject it otherwise to the same test conditions, you will find that its ductility rate is about 1/10 that of

the original bar. The paper stated further that high ductility was not necessary in a weld in order to have the member develop its full strength. It warned against indiscriminate peening because of the danger of developing minute cracks.

Why do we want ductility? asked E. Chapman, Lukenweld, Inc., Coatesville, Pa. We all know that we want it but we do not know why. In studying the question of ductility Mr. Chapman pointed out that investigators should consider the materials, stress, impact loads, thermal loads and vibrating loads. He said that from the point of view of machine design ductility in so far as it referred to the stretch of a metal after the elastic limit had been reached did not contribute a thing. If a precision tool stretches out of line it then is useless however toughly it may hold together. The chief property desired by the machine designer, according to Mr. Chapman, is a high elastic limit. Of course he wants a good, clean, close-grained steel and this of necessity means a fair rating as to ductility.

## Should Weld Equal Base Metal

In boiler design high ductility is important, according to E. R. Fish, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn., who presented a paper describing some phases of welded pressure vessels. He said that from the point of view of the insurance companies, the higher the ductility the better so long as other physical properties were not sacrificed. The subject of ductility of welds is a controversial one, he pointed out. At least one company is beginning a series of tests to determine, if possible, the actual value of greater ductility and the results of lower values under representative operating conditions. Those whose interests lie in the welding field should persistently follow a well-ordered plan of research and not hesitate to give the results to the world, he said.

In discussing this paper H. E. Rockefeller, Linde Air Products, New York, said that Mr. Fish evidently favored as high a ductility in the weld metal as the traffic would bear. It has been contended, he said, that high ductility means the elimination of cracks yet much experimental work indicates that steel of high ductility has a relatively low shock resistance. Steel with high fatigue resistance has a high yield and a comparatively low ductility he pointed out, adding that many ills have been incorrectly laid to the lack of ductility.

Taking up a question suggested incidentally by Mr. Fish, Mr. Rockefeller said that if you know how to do

it cast iron is one of the easiest materials to weld. In all structures he thought it was important to change the technique of fabrication so as to avoid the cause of trouble rather than to try to avoid it by introducing high ductility into the weld. He stated emphatically that a high ductility running from 20 to 30 per cent was not only not necessary in pressure vessel welds but that it might even be injurious.

T. W. Greene, Linde Air Products Co., New York, in a paper on pressure piping said that we must not confuse high ductility rating with high serviceability rating. He said that the difference between these two was represented by the stretching after the elastic limit had been reached. This stretching represents a large part of the total ductility rating. After describing the various methods of welding and laying pressure piping, Mr. Greene summed up the whole subject of ductility in this field by stating that experience indicates that a ductility of some 10 to 12 per cent was sufficient.

By the aid of X-ray or other testing devices we often locate a defect and then with much trouble dig it out and fill in the space with welded metal with a total result that it would have been better to have left the original defect as it was. This was the comment of C. J. Holslag, Electric Arc Cutting & Welding Co., Newark, N. J., in his discussion of the general question of ductility.

## Ductility Difficult to Determine

The definition of ductility was again discussed in a paper by C. H. Jennings, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The ductility of welded metal is often difficult to determine because the reduction in area and break under test usually occurs outside of the weld. He suggested using a weld with holes drilled in it to cause the reduction and failure to occur at that point and described a close relation between elongation in 1 in. for a weld with holes in it and elongation in 2 in. for the solid metal. Written discussion of Mr. Jennings' paper was submitted by A. M. Candy of the same company. In some structures, notably machinery bedplates and buildings, ductility is not essential according to Mr. Candy. In all fabrication the nature of the work and the size and shape of the various members should be considered before an opinion on ductility rating is given.

Charles A. McCune, vice-president and technical director, *Industry and Welding*, read a paper on the significance of ductility which had been prepared by Prof. H. F. Moore of the

# rs Discuss Progress

University of Illinois. This was a technical and scholarly presentation of the whole subject of ductility of welds. Professor Moore said that the testing of various joints under practical conditions was still the only reliable method of determining the required ductility in a specified case. He said nevertheless that it was always highly important that the weld metal have ordinary ductility to overcome internal strains in the process of welding.

W. B. Miller, Union Carbide & Carbon Research Laboratories, discussed Professor Moore's paper and further pointed out the necessity of giving ductility its proper position in relation to other physical properties and in particular, to crackless plasticity. He said he felt that high ductility is not an advantage if it causes a sacrifice in tensile strength and in crackless plasticity. Others to discuss the ductility in welds were Prof. D. Rosenthal of the University of Brussels, C. A. Waddell, Worthington Pump & Machinery Corp., New York, and J. H. Critchett, Union Carbide & Carbon Corp., New York.

Mr. Critchett summed up the various papers and pointed out that while a few authors championed high ductility as an important characteristic of weld metal the majority of the speakers were of the opinion that this property should be subordinated to other properties and that so long as the proper strength was secured in the weld a fair ductility rating only was necessary. This property was desired chiefly to relieve internal strains and to improve the technique of welding. He repeated the comment of several speakers that a ductility somewhere around 12 to 15 per cent was safe and desirable.

## Welding Used in Building 10,000-Ton Cruiser

DETAILS of the welding done on one of the 10,000-ton Treaty cruisers, including data on design of welded members, materials and organization, were given by Capt. J. O. Gawne, United States Navy, Brooklyn, N. Y., in a comprehensive paper on "Welding on the U.S.S. New Orleans." Rapid increase in the use of arc welding in the construction of naval vessels, it was pointed out, has been one of the outstanding developments in recent shipbuilding practice.

The U.S.S. New Orleans is one of seven 10,000-ton cruisers under construction at this time. It is 588 ft. long overall, 61 ft. 9 in. beam, 21 ft. 7 in. draft, and mounts a battery of nine 8-in. guns in three triple turrets and eight 5-in. anti-aircraft guns. She carries seaplanes which are

launched from catapults and picked up from the water.

Welded members include medium steel transverse and longitudinal bulkheads; this includes 90 per cent of the bulkheads on the ship. All medium steel plating and transverse beams connected to medium steel deck plating are welded. The shell butts will be welded for the first 96 ft., and the two upper outboard strakes of plating of the inner bottom on each side are welded at the seams and butts. This represents approximately 20 per cent of the joints of the inner bottom.

Toward the ends of the vessel the main strength longitudinals taper down to stringers, which are welded. In addition welded stringers are interposed between the extension of the longitudinals. Breast hooks, or the horizontal brackets at the bow, are entirely welded. Deck erections are welded throughout, with the exception of the special treatment steel portion. Foundations for auxiliaries and for the catapult are welded; of the latter the top and bottom angle bar connections are riveted.

Gun foundations for the anti-aircraft battery are to be welded, this being said probably to be the first instance in which a gun foundation will be completely welded. Fittings are designed for welding. Notable examples of application of welding to auxiliaries are the steering gear and anchor windlass. Practically all the bearing supports for this machinery are made up by welding.

## Welds Galvanized Material

In the construction of this cruiser welding is applied to medium steel, special treatment steel, cast steel, cast and rolled aluminum alloys, and steel and wrought iron pipe. Galvanized material, such as scantlings, was said to be best welded by making the weld in two layers. The first layer is deposited with a small electrode and light current. The second layer, deposited with a standard size electrode, gave the cross section necessary for strength and fused out the gas pockets in the primary bead. Data on the welding of other materials were given and sections of the paper were devoted to layout in mold loft and manufacture in the shop, installation on the ship, and inspection and testing of welds.

With the all-welded construction it is essential that the plates be initially flat if the finished structure is to be fair and true to dimensions. An outstanding lesson learned was the importance of avoiding too much local heat. Most of the difficulties caused by welding were said to be due to



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New President  
American Welding Society

shrinkage on cooling of the weld. It has been found important to establish a definite sequence of procedure for doing the work, and of even greater importance to distribute the heat by skipping about and stepping back so that no one locality is subjected to too concentrated a heating effect.

In conclusion it was stated that there seems little doubt that a material saving in weight can be effected in designing structures for welding by eliminating faying flanges, reducing widths of overlaps, by proportioning the members, such as stiffeners and beams to the loads they must bear, etc. The weight thus saved can be used for increased carrying capacity, or pay load, in a merchant vessel and for increased fighting qualities in a warship.

## Automatic Welding Used In Building Barges

The design and construction of welded steel barges were described by Gordon G. Holbrook, general superintendent, Federal Shipbuilding & Dry Dock Co., Kearny, N. J. Nine of these barges have been built by the Federal company since 1928. Two of them carry sand and gravel, two others carry molasses in bulk, one is a derrick lighter, and four carry gasoline in bulk. Three of the latter are 175 ft. x 36 ft. x 12 ft. 7 in. in size and are of 10,000-barrel capacity.

The Holbrook system of electric welded construction (patented) is used in building these barges. The basic principle of this design is the joining of rolled structural channels with intermediate flat bars, all united with a double seam of electric welding. Transverse framing members run continuously over the toes of the channels, and are widely spaced. The method is believed to produce a structure of great local and longitudinal



stiffness. The design permits extensive use of full automatic welding in the important shell and deck seams, and it was stated that from 67 to 80 per cent of the entire welding on a barge may be done in this manner, assuring uniform and precise workmanship.

#### Practical Methods In Production Welding Described

**R**USTLESS steel of the 18 and 8 variety is peculiarly suited to spot welding according to Carl DeGanahl, president, Fleetwings, Inc., Garden City, N. Y. According to the author, this alloy can be annealed by heating to a high temperature and quenching and it is this property, strangely similar to that of copper, that makes it an excellent material for spot welding. The very welding process is a repetition of the quench method of annealing. Under the action of the electric current the author has found that the metal is heated almost instantly to a fusion temperature and immediately following this the heat is conducted away between large copper electrodes and the surrounding cool metal. The effect is that of more rapid chilling than would take place in a water quench and the result, according to the author, is an annealed welded metal which gradually radiates out to the hard material unaffected by the heat.

In aircraft construction, Mr. DeGanahl has found this 18 and 8 alloy easy to work and more satisfactory to use than any of the other alloys used in this field. He said that chrome-molybdenum is popular among aircraft builders because it is suitable for torch welding and may be hardened to most any required strength up to 240,000 lb. per sq. in. by heating and quenching. However, after quenching the material is brittle, which makes it difficult to use for spot welding because the quench action of the weld causes a ring of glass-hard metal to form around the spot and in this condition a sudden blow is sufficient to rupture the weld. The speaker admitted that such a hardened ring could be made satisfactory and reliable by subsequent heat treatment but he said that in complicated built-up structures such as used in aircraft work, the very operation of heat treating frequently causes internal stresses sufficient to break many of the welds before they can be normalized.

Mr. DeGanahl admitted at the start of his talk one unfortunate property possessed by the 18 and 8 alloy. When this alloy, he said, is heated to between 500 deg. and 900 deg. C., the carbon tends to come out of solution and combine with the chromium forming chromium carbide which concentrates along the crystal face of the metal. When this occurs the steel ceases to be stainless and becomes subject to a dangerous type of corrosion. However this effect may be avoided in spot welding. The same

### NEW OFFICERS AMERICAN WELDING SOCIETY PRESIDENT

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### AMERICAN BUREAU OF WELDING

Director: C. A. Adams, professor of engineering, Harvard Engineering School. Vice-Directors: H. M. Hobart, consulting engineer, General Electric Co., and J. H. Critchett, head of research, Union Carbide & Carbon Corp. Secretary: W. Spraragen.

range of temperature must be passed through both while the welded part is being heated and while it is being cooled but the heating and cooling may be so extremely rapid, according to the speaker, that the carbon has no time to come out of solution.

Mr. DeGanahl said that his engineers had found it necessary to regulate carefully the technique of spot welding in order to avoid any possibility of this corrosion effect. He explained in considerable detail the mechanism used to insure rapid heating and cooling and in the discussion which followed the paper he said that he used two switches, one for making contact and the other for breaking it. This was to avoid the effect of inertia and give the shortest possible interval of contact. He said he used separate contact outside of the main contact to avoid tendency to burn and pit. Both the pressure and the time are accurately regulated, the timing switches at the Fleetwings plant being adjusted to operate in steps of one cycle from 1 to 20 cycles.

Dr. W. R. Hainsworth, Servel, Inc., New York, was one of those to discuss Mr. DeGanahl's paper. He said that in his experience with 18 and 8 alloy in the construction of refrigerators, the use of rapid spot welding methods had cleared up all corrosion trouble.

#### Effects of Welding on Properties of Austenitic Steels

**D**R. JOHN A. MATHEWS, vice-president and director of research, Crucible Steel Co. of Amer-

ica, in a paper on "Cause and Cure of Intergranular Corrosion in Austenitic Steels," discussed some of the effects of welding upon the properties of these materials, and possible means of alleviating the deleterious effects produced by welding operations.

It is to be regretted, he said, that these highly alloyed products are called "steels," for in many of their characteristics they differ so widely from ordinary steels with which we have been familiar for generations that fabricators are apt to become confused in attempting to use them, because of their lack of appreciation of the fundamental differences in their behavior. . . . No matter how much you may know about ordinary steel, you must learn to think in entirely different terms when you work with the austenitic chromium-nickel alloys, he pointed out.

When the austenitic chromium-nickel steels are reheated for any purpose between temperatures of 1000-1500 deg. F., a change takes place in the structure which renders them subject to attack by many electrolytes, this attack taking place between the grains so that after long duration the material becomes very weak and brittle, and in some cases may even be crumbled with the fingers. This is known as intergranular corrosion. Dr. Mathews then outlined the usual explanation for this corrosion.

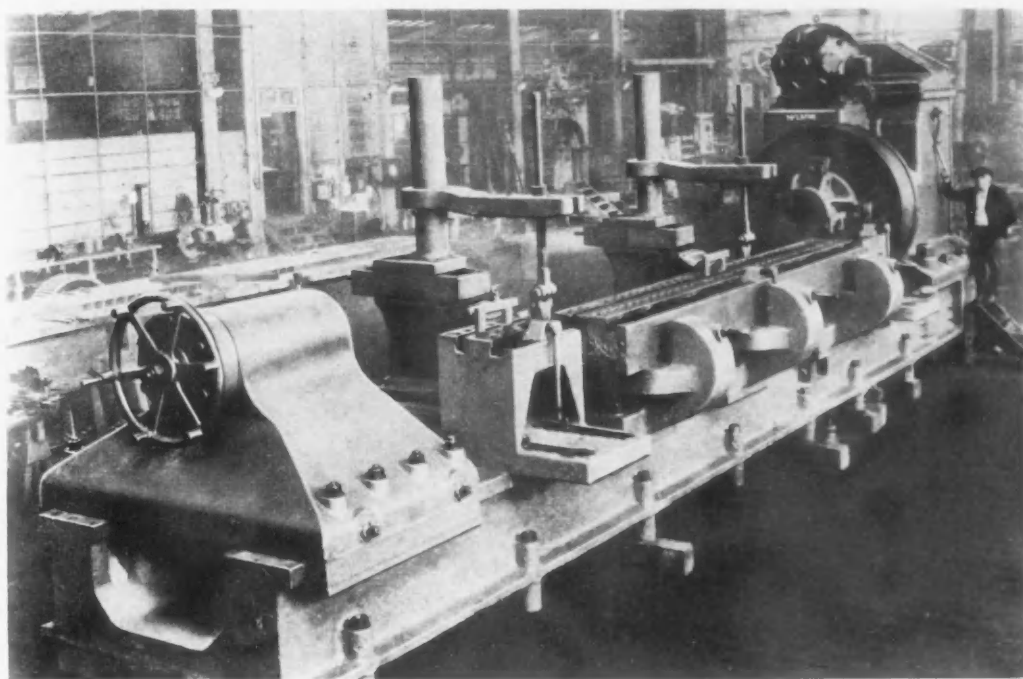
As to the cure for intergranular susceptibility, three methods were discussed. The first results from the manufacture of an alloy with the lowest possible carbon content. With carbon below 0.07 per cent, it is usually found that danger of intergranular corrosion is minimized, he said.

The second method of prevention, one that has had considerable application and that is very certain in its effect, results from heat treating all over the welded part. After a weld has been made and presumably carbide precipitation has occurred in the regions adjacent, it is possible to totally remove this effect by preheating to some temperature—usually from 1800 deg. F. upward, depending upon the amount of total carbon or carbide which must be taken into solution. This high heat treatment also removes stress effects introduced during the process of fabrication, and brings about a more uniform or homogeneous condition throughout the entire part being manufactured.

The third method of preventing intergranular susceptibility is by the addition of certain other elements to the austenitic chromium-nickel steels, which have been found to act as inhibitors to prevent, or to greatly retard, intergranular susceptibility. The three methods described may be employed separately or all together.

In conclusion Dr. Mathews said: "The conditions leading up to intergranular susceptibility have been thoroughly investigated by many (Concluded on advertising page 22)





THIS roll lathe, believed to be the largest, will take a roll 82-in. in diameter and 26 ft. long with its standard equipment. With modifications of tool equipment, it will swing 88-in. rolls. The design provides the strength and speed that permits use of cemented carbide tools.

## Roll Lathe for Largest Applications

DESIGNED to serve the tremendous rolling mill installations of the past year, and several of even greater size now in prospect, the United Engineering & Foundry Co., Pittsburgh, has just completed what is believed to be the largest roll lathe ever built. Although nominally a 70-in. lathe, comparing with a maximum of 60 in. in the industry heretofore, this unit will take a roll 82 in. in diameter and 26 ft. long, overall, with its standard equipment, and with

slight modifications of the tool equipment can swing a grooved or straight-face roll 88 in. in diameter.

The principal demand for rolls of such large sizes is in the continuous wide hot strip mills and 4-high plate mills which are changing the entire process of rolling flat material. Practical foundry limitations formerly restricted the size of mills and rolls, but with the recent changes in furnaces and other foundry equipment the limits have been extended to new

maximums. The new large roll lathe is designed to handle the turning and dressing of all such rolls with ease.

The new lathe is 49 ft. long, all roller-bearing equipped, with inclosed headstock, two speed ranges, automatic lubrication system, massive cast-steel bedplate and complete equipment of necking rests, piano rest, tailstock, housings, topping rig, etc. The bed plate alone weighs 134,000 lb. Floor space requirements have been kept to a minimum and ease of control has been provided. In designing this lathe, allowance was made, both in speeds and in strength for use of the new tungsten carbide and similar cutting tools.

## Truck Picks Up Load With 2-In. Under-Clearance

A NEW lifting and tiering truck that will pick up cleated loads with 2-in. under-clearance has been placed on the market by the Clark Trutractor Co., Battle Creek, Mich. The load is carried on 26-in. long tapered steel fingers which touch the floor in the down position, but tilt back slightly in the first 5 in. of rise, insuring balance for the load.

Flexibility is secured by four-wheel steer and rear-wheel drive. The turning radius of the 2-ton truck is 89 in. and that of the 3-ton model is 98 in. The machine is gas-powered for continuous operation. Maximum lifting and carrying capacity is assured by the powerful hydraulic lift, mounted over 15-in. x 7-in. rubber tires. Speeds range from 1 to 6 miles an hour.

The machine will tier to a height of 50 in., and because of its low overall height, 77 in., it is well suited for load-

ing box cars. Special machines with greater tiering height can be built on this same chassis.

CLEATED loads with as little as 2-in. clearance under them may be picked up. The load is carried on tapered fingers which touch the floor in the down position but tilt backward slightly in the first 5-in. of rise.



## Improved Radiograph Gas Cutting Machine

IN announcing the new Airco-D-B No. 4 Radiograph illustrated, the Air Reduction Sales Co., 60 East Forty-second Street, New York, emphasizes greatly improved design and performance as compared with its previous machine, the No. 1-A Radiograph.

This portable motor-driven oxy-acetylene cutting machine is offered for straight-line and circular cutting of steel of almost any size and thickness. Contours are also cut efficiently and adjustments are provided for bevel cutting. For straight-line work, the machine travels on a track. Set-up of the work is facilitated through use of a clutch, which permits free rolling.

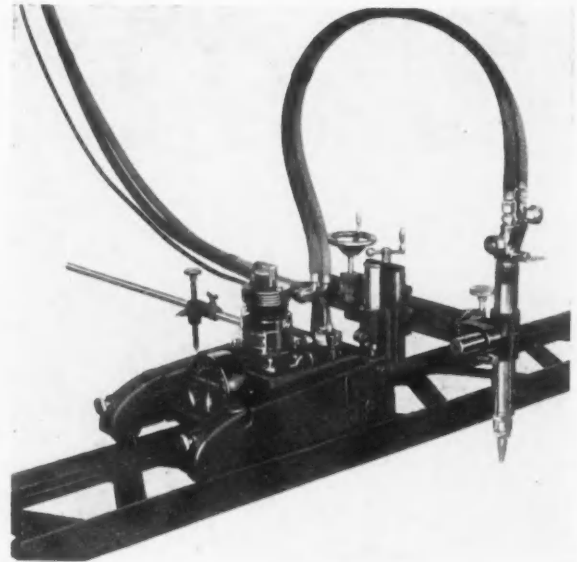
The carriage of the new machine has a lower center of gravity and is broader, so that there is no tendency of the machine to become unbalanced even with the torch in its outermost position. Two of the four carriage wheels are swiveled and act as trailers. The machine has a minimum of projecting parts, and the wheels are almost completely shrouded for protection against oxides and dirt when cutting steel.

An improved variable-speed motor of approximately 75 watts rating is used for the drive. It is said to have practically constant torque at all speeds and to maintain a nearly constant speed under fluctuating voltage and increasing temperature. The machine will operate on either 110 or 220 volt alternating or direct current without any change or adjustment except that the different voltages require individual bottom cover-plates on the carriage. The drive to the traction wheels is through a double worm reduction and a simple clutch. All gearing and electric switches are inclosed in a dust-proof case. Gears are lubricated by grease which requires replenishing only at rare intervals. Complete control of the motor, the speed, the direction of travel and of connecting the motor to the traction wheels is had by means of three levers and a thumb screw grouped near each other on the carriage. A thumb plate permits actuating the levers without jarring the machine while cutting. A tachometer, furnished as an extra, indicates the cutting speed in either direction.

Carriage travel can be varied from 3 to 28 in. per min. by manipulating the thumb screw on the speed governor, and speed may be changed during the cut without break in the cut or in the continuity of travel.

Cast integral with the carriage, front and rear, are sturdy handles for lifting and carrying the machine, which with the adjustment torch arm

THE improved design greatly facilitates the cutting of plates, shapes, billets, forgings and steel castings. Set-up of the work is made easier by a clutch which permits free rolling.



and torch weighs approximately 70 lb.

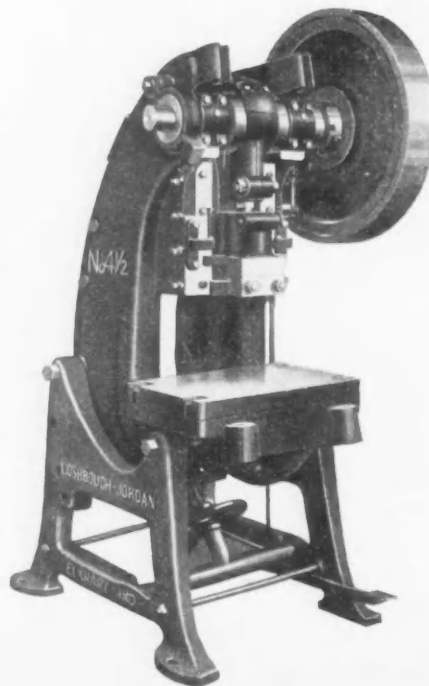
Circular as well as straight cuts are said to be made with equal efficiency. A 36-in. radius rod is standard equipment; it fits into a hole extending through the carriage and is held in position by two wing nuts. This rod may extend from either side of the machine. Circles ranging from 4 to 80 in. in diameter may be cut with the 36-in. rod and the center point provided.

To assure a fixed amount of slack in the hose torch adjustment and to prevent the drag of the hose from disturbing the torch setting, as well as to hold the hose and extension cord

clear of the operating controls, a special bracket is mounted opposite the post that holds the torch adjusting arm. This bracket is removable. The plug and socket connecting the extension cord to the machine are of locking type to prevent accidental disconnection. The track is made of special 8-in. I-beam, the flange edges of which constitute the rails. Because of their shape scale and dirt cannot accumulate on the rails. Tracks are made in two lengths, one for straight cuts up to 5 ft. long and the other for cuts up to 8 ft. long. Two lengths may be joined for making cuts of any required length.

## New O-B Inclinable Press

LARGE die space, deep throat, large bolster plate area, large opening in the bed and back and low height of bed plate when inclined are features of the No. 4½ open-back inclinable



press brought out by the Loshbough-Jordan Tool & Machine Co., Elkhart, Ind. The machine is of sturdy construction and is offered for all classes of press work. Three styles, flywheel, geared and combination geared, are made.

The flywheel type is capable of delivering approximately 40 tons pressure to the bottom of the ram. The weight of the flywheel press without skids is approximately 4100 lb. The standard stroke is 3 in., and the maximum stroke, at extra cost, is 7 in. The round opening in the bed is 12½ in. in diameter and the oblong opening is 10 x 15 in. The opening through the back is 14 in. The depth of throat, ram center to frame, is 8¾ in.

## A New Metal Paint

A paint, for which claims are made that it is a perfect insulator against electricity and has unusual abrasive qualities, is announced by the Eastern Mabelite Corp., 225 Mercer Street, New York. Its base is mabelite ore, discovered a few years ago in Comanche County, Oklahoma. The mined ore is finely ground so that a 325 mesh pigment is obtained. The new paint is said to have proved highly resistive to acids and practically impervious to salt water.

## Introduces New Line of Plating Machines

A NEW line of barrel-type plating machines designated as the "National," has been brought out by the National Steel Products Co., Dayton, Ohio, replacing the "Crown" line previously manufactured by the company. Both bale and lift arm type are available. Sturdy construction and simplicity intended to reduce time loss and other expense due to parts replacement are features.

The tanks, made of double welded sheet steel, are of unusual capacity and are protected against corrosion. Anode bars are of large capacity and properly insulated. The brass cathode contacts are fully insulated. Provision is made for exact automatic location of cylinder contacts in cathode contact saddles. Anode bars and cathodes are connected by flat buss bars fully seated and protected against corrosion at points of juncture. Lined cypress tanks or rubber lined tanks can be furnished. Tanks will be equipped with heating or cooling coils if specified.

Cylinders are suspended in hangers of rugged design. The hanger frame and cathode connecting points are cast integral and become the electrical connection when the cylinder is in the operating position. The hanger has two contacts on the drive end and one contact on the opposite end, thus giving the assembly three-point suspension. The entire hanger mechanism may be disassembled by the removal of two nuts.

Ample current-carrying section is provided and the lower end of the bronze hanger frame becomes the cylinder shaft bearing. The lower end is insulated with molded hard rubber to a point above the solution line. The driving pinions, as well as the shaft are carried in the hanger; the driving pinion meshes automatically with the motor pinion when the cylinder is in position.

In the lift-arm type the cylinder is carried between insulated arms which act as current conductors as well. These arms are mounted on a heavy shaft driven by worm and gear.

Direct connected individual motor drive is standard. The motor and primary speed reducer are built as a special unit.

Molded hard rubber was selected as standard for the National plating machine cylinders after experiments and service tests. Records cited of unusual service include cylinder operating in cadmium solution under heavy production for 3½ years, and found at the last observation to be in very good condition. Hard rubber, it is pointed out, is impervious to impregnation and can be cured to give

STURDY construction and a simplicity intended to reduce the time and expense due to parts' replacements are features. Both bale and lift arm types are made. The standard cylinder is made of hard rubber.



great strength. It is not necessary to use fabric or other fibrous inserts.

The cylinders of the new machines are of improved design. Simplicity is a feature and all parts are made interchangeable to facilitate replacements. Panels are supported in the rail slots for the entire length; and end support is provided by slots in the heads.

The method of supporting the door panel is a feature. Full length support in the rail slot is used on one side and convenient friction controlled

locking bars on the opposite side. The locking latches are secured to the door panel to prevent loss of these parts or opening of the door locking device while the cylinder is in operation. Standard hard-rubber cylinders are equipped with short shafts at each end with wheel-type dangles. The dangles have insulated hubs and spokes which are easily removed. A through-shaft and dangles of "hair-pin" type can be supplied. Cylinders made from Formica or Micarta can also be furnished.

## Alloy Steel Centrifugal Pump for Acids

A PUMP for handling acids in a process work is being built by the Allis-Chalmers Mfg. Co., Milwaukee. It is of the single suction type and all parts coming in contact with the acid being pumped are made of a chrome-bearing steel.

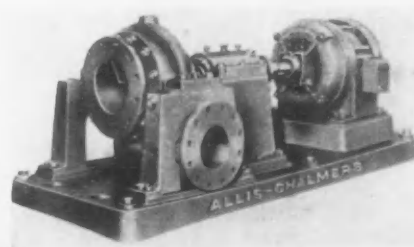
To insure uniform expansion from the center of the pump when handling acids of high temperature, the casing is supported on the horizontal center line by brackets and it is also keyed on the vertical center line underneath the water-cooled stuffing box.

The pump is so constructed that the rotating element including the self-

aligning, anti-friction bearings and the Falk coupling can be removed through the suction end of the pump without disconnecting the discharge piping or casing brackets or disturbing the motor. Tests of these pumps are said to reveal high efficiency and quiet operation.

Shipments of tungsten concentrates produced in the United States in 1931 amounted to 1404 net tons carrying 60 per cent  $WO_3$ , valued at \$928,000, compared with shipments in 1930 of 702 tons, valued at \$509,000, according to the United States Bureau of Mines. Mine stocks of concentrates on Dec. 31, 1931, were equivalent to 339 tons of 60 per cent  $WO_3$ , compared with 560 tons at the end of 1930. Imports of tungsten ore and concentrates in 1931 contained 167,352 lb. of tungsten, equivalent to 176 net tons of 60 per cent  $WO_3$ , as against 3,694,894 lb. of tungsten, or 3882 net tons of 60 per cent  $WO_3$  in 1930.

Domestic production of merchantable fluorspar in 1931 at 47 mines was 55,000 net tons, against about 130,000 tons produced at 65 mines in 1930, according to the Bureau of Mines.





# Russia Completes Purchases of 300,000 Tons of German Steel

## Negotiations On for Additional 200,000 Tons—Welsh Tin Plate Makers Abandon Minimum Price

LONDON, ENGLAND, May 2 (*By Cable*).—Inquiry is broadening but buying is still very slow. Continental steel works are struggling for orders. Gold prices are easier. British purchases of Continental steel are affected by exchange movements.

The Welsh tin plate makers have abandoned the minimum price, but are retaining the pooling plan. Consumers have been taken aback by this sudden decision and business has virtually ceased, with prices nominal.

European tube makers are meeting at Prague this week.

German, French, Belgium and Luxembourg hoop makers have agreed on a price arrangement for hot rolled hoops ¾-in. by No. 20 gage for India.

Russia has concluded a contract with the German Steel Works Association for the remaining 150,000 tons of its 300,000-ton purchasing program. The entire 300,000 tons is divided as follows: billets, 10,000 tons; shapes, 33,000 tons; bars, 125,000 tons; and plates, 132,000 tons. There are prospects of a further order for 200,000 tons.

Bulgaria has contracted with the French Engineers Societe Batignolles for the reconstruction of the Belgrade Resnitz Railway, at a cost of 20,000,000 fr.

The Reichstag committee has ap-

### British Prices, f.o.b. United Kingdom

Ports	
Per Gross Ton	
Ferromanganese, export	£9 0s.
Billets, open-hearth....	5 7 6d to £5 12s. 6d
Black sheets, Japanese specifications .....	9 12 6
Tin plate, per base box	0 15 (nominal)
Steel bars, open-hearth	7 17½ to 8 7½
Beams, open-hearth....	7 7½ to 7 17½
Channels, open-hearth....	7 12½ to 8 2½
Angles, open-hearth....	7 7½ to 7 17½
Black sheets, No. 24 gage .....	8 0 to 8 10
Galvanized sheets, No. 24 gage .....	9 10

### Continental Prices, f.o.b. Continental

Ports	
Per Metric Ton, Gold £ at \$4.86	
Billets, Thomas.....	£2 2s. 6d
Wire rods, No. 5 B.W.G.	4 10
Black sheets, No. 31 gage, Japanese.....	11 5
Steel bars, merchant....	2 4
Beams, Thomas.....	2 4
Angles, Thomas, 4-in. and larger .....	2 3
Angles, small.....	2 5
Hoops and strip steel over 6-in. base.....	3 5
Wire, plain, No. 8.....	5 7½
Wire, barbed, 4-pt., No. 10 B.W.G.....	8 10

proved rehabilitation plans for the Vereinigte Oberschlesische Huttenwerke, reducing capital from 30,000,000 m. to 4,000,000 m., then raising to 20,000,000 m.

Eschweiler Bergwerksverein has resumed operation of its seamless tube works.

## Steel Companies' Losses Are Large; National Steel Alone Makes Dividend

LEADING independent steel companies, whose financial reports have been issued in the past week, generally suffered larger losses in the first quarter of this year than in the final quarter of last.

The Bethlehem Steel Corpn.'s report showed a total loss in the past quarter of \$5,330,769 after provision for interest charges, depreciation, depletion and preferred stock dividends, against a deficit of \$3,421,938 for the preceding three months' period. Operations of the Bethlehem mills averaged only 23.4 per cent of capacity in the past quarter compared with 30 per cent in the preceding quarter. It was reported that current operations are at

22 per cent, this applying to last week. Directors declared the regular dividend on preferred stock. The total income of the corporation the past quarter, amounting to \$1,431,657, was not sufficient to meet interest charges, which were \$1,794,039.

The Republic Steel Corpn. reports a deficit of \$2,476,292.79 for the first quarter. The net loss from operations was \$2,401,292.79. The only dividends paid were \$75,000 on the guaranteed stock of the Trumbull-Cliffs Furnace Co. The net gain from operations before interest charges and allowance for depreciation and depletion was \$350,977.89, which fell considerably short of interest charges alone. In

the entire year 1931 the Republic company had a loss of \$9,034,152.85.

The Inland Steel Co., one of the few companies to make a profit in 1931, which amounted to \$1,263,599.67, had a net loss in the first quarter of \$820,540.62, after charges for interest and depreciation and depletion. The Inland company omitted dividends on its stock.

The National Steel Corpn. again showed its quarterly dividend requirements more than earned. The net profits for the first quarter were \$592,799 after all charges and Federal tax, equal to 27½c. a share on stock outstanding. In the fourth quarter the company's net earnings were \$668,713, equal to 31c. a share.

The Colorado Fuel & Iron Co. had a deficit in the quarter of \$399,278.71 without allowance for equipment dismantled. This company's 1931 loss amounted to \$3,363,206.69.

The Wheeling Steel Corpn. had net loss in the quarter of \$628,623 after all charges. Total deduction from surplus was \$823,137, leaving a balance of \$8,115,336. The company's 1931 loss was \$3,339,139.

## Stainless Steel Car Bought by Reading

The Reading Railroad will shortly operate the first stainless steel, pneumatic-tired rail car of the Budd-Michelin type in this country, according to an announcement by the Edward G. Budd Mfg. Co., Philadelphia. The railroad has entered its order for a new 56-passenger, pneumatic-tired, stainless-steel rail car, powered by an 85 horsepower Diesel motor. The car will be placed in service between Princeton and Trenton, N. J., and may also be used experimentally on other parts of the Reading system. The order for the car was placed by C. H. Ewing, who was elected president of the Reading only last week.

"The Reading will be the first road in this country to use one of these new rail cars in actual service," Budd officials pointed out. "The French roads are already using a rubber tired Michelin rail car. We have been running our original Budd-Michelin car at irregular intervals and on tests since early this year. This type of rail vehicle, made entirely of stainless steel and fabricated by the Budd method of shot welding, makes possible extremely light weight and provides a permanency of construction not otherwise possible. This light weight permits it to be operated at from one-half to one-third the cost of existing rail vehicles. The pneumatic tires, plus the light weight, provide new standards of riding comfort on rail vehicles, and we are convinced that this initial trial of a light-weight, pneumatic-tired car marks the inauguration of a new era in American rail transportation."

# Federal Reserve Program Needs Support of Bankers and Industrialists

By DR. LIONEL D. EDIE

EVERY banker and every industrialist has a stake in the policy recently adopted by the Federal Reserve System.

The officials of the system have provided the mechanics; American financiers and business men can lend invaluable support and cooperation.

What are the mechanics of the policy? The Federal Reserve is buying weekly a substantial amount of Government bonds in the open market. The current rate of purchases is approximately \$100,000,000 each week.

The layman is likely to find this a highly technical procedure. What does it mean? What is its purpose? How does it affect industry? Such questions, asked every day in business circles, are a frank search for interpretation of one of the most important efforts of modern times to apply constructive leadership to the problems of a great depression.

## What the Policy Means

1. *The new policy is an effort to correct monetary maladjustments in the depression, without denying in any way the importance of industrial maladjustments.*

For a long time, the depression was treated as almost exclusively a case of over-production. Too much copper, too much wheat, too much of many different commodities—such was the diagnosis of the disease. Now it is recognized that these surpluses of certain goods are a symptom not only of bad industrial planning but also of a vicious circle of financial liquidation. This vicious circle has to be broken by monetary policy. Such a policy is calculated to release the latent industrial resources of the nation.

2. *The new policy is calculated to safeguard the liquidity of the community, and stands in contrast with the recent mania of individual liquidity.*

The individual banker seeks liquidity as a matter of self-preservation. This is natural enough under the circumstances, but collectively the banks are less liquid after the pursuit than before. Indeed, they bring the house down on their own heads.

The new Federal Reserve purchases of Government bonds place fresh liquid cash at the disposal of the

banks collectively and individually. The new funds in the course of time relax the pressure for individual liquidation of loans and bonds in bank portfolios.

3. *The new policy has the effect of reducing rediscounts of member banks, in other words, of giving them free and unencumbered reserves rather than borrowed reserves.*

In a period of fear, banks feel uncomfortable about borrowing their reserves from the Federal Reserve bank. As soon as they get out of debt in the form of rediscounts, and have their reserves outright, they are in a position to serve the community more safely and adequately.

When a Federal Reserve bank buys Government securities, the proceeds find their way into member banks. More cash is on hand. Part at least is used to reduce rediscounts, and so to create a condition of greater freedom of action in the banking system.

4. *The new policy is calculated to increase deposits of the member banks.*

Nothing impresses a banker more than an increase in deposits. It is more money to be put to work.

Given a moderate period of time, deposits tend to increase more than dollar for dollar of new funds created by Federal Reserve action. This is because of the reserve ratios permitted of member banks. For instance, New York City banks keep legal reserves at the Federal Reserve bank of 13 per cent of their demand deposits and 3 per cent of their time deposits.

Federal Reserve purchases of "Governments" create the 13 per cent and the 3 per cent: commercial banks over a period of weeks or months tend under favorable conditions to create the rest by the process of loans, investments and deposits.

5. *The new policy is a step in the direction of restoring confidence in lending to sound borrowers.*

No one should expect banks to make unsound loans. That is not the question.

The spokesman of an important bank during the past week explained: "Two months ago we absolutely would not loan a dollar; now we are anxious to locate good propositions."

Another bank explains: "There are

many borderline cases where we can now take a more liberal attitude."

No loan would be sound if the vicious spiral of liquidation were to go on. Soundness is relative. Once arrest the mad pursuit of individual liquidity and you begin slowly to make it possible to rebuild confidence and soundness.

6. *The new policy requires cooperation on the part of the bankers.*

The Federal Reserve officials alone cannot produce a successful outcome. Mechanics of money market procedure cannot do it.

The mental attitude of the banking community is of crucial importance. Privately, leading bankers express their desire to cooperate wholeheartedly in the new constructive effort. If they do so, they will greatly help the policy to catch on and accomplish useful results.

7. *The task is more than a banker's task; it is also an industrialist's task.*

For the most part, industrialists are wondering what this new policy is capable of doing for them. It is capable of giving them a better capital market, of improving their chances of reasonable credit accommodation, of financing some of their customers desirous of buying goods.

They should also be thinking about what they, as industrialists, can do for the new policy. The Federal Reserve needs their cooperation.

There is a magnificent opportunity for leadership on the part of captains of industry. A public declaration on the part of a few men who command the confidence of the rank and file would reinvigorate the confidence of the many.

The Federal Reserve policy is intended to help the steel man, the automobile man, the oil man. It is their policy: it needs their vigorous and organized support.

Attitudes toward stocks of materials to carry, toward orders for new equipment, toward launching advertising campaigns, toward financing of customers, toward translating money into the purchasing power of a community, are involved.

8. *Political authorities should not block the way by failing to balance the budget.*

The Federal Reserve authorities could not afford to wait for a bal-

anced budget before embarking upon their policy. But their policy will be under an almost insuperable handicap if the budget is not balanced.

A balanced budget will help immensely to bring capital out of hiding. Deficits might impair the credit of the Government itself and perhaps force the country off the gold standard.

#### A Conservative View

The whole matter deserves to be viewed from a conservative, practical standpoint. The depression has reached an acute stage and the monetary aspect of the whole maladjustment has come to the forefront of attention. Responsible authorities have set forth upon an attempt to combat financial disintegration. Doubtless many receiverships will have to come anyway, and where such action is called for by the inherent unsoundness of capital structures, the painful process should be gone through with. But the Federal Reserve policy should moderate this phase of the readjustment and should help to prevent unnecessary creation of new distress situations such as would be the inevitable fruit of continued deflation.

The difficulties to be overcome are tremendous, and no one can say with absolute certainty in advance that they will be overcome. There is no magic involved and no panacea. There is a courageous attempt to restore order and balance to our economic system. Time will be required. The great complexity of the depression will present obstacles. Set-backs will be encountered. But a plan of action has been laid down and it will command the support and cooperation of many thoughtful people who believe in fighting adversity.

## Fabricated Structural Steel Orders Gain

WASHINGTON, May 3.—Fabricated structural steel bookings totaled 58,820 tons in March, according to reports received from 260 establishments by the Bureau of the Census, and compare with 57,292 tons reported by 267 establishments in February. Computed orders were 64,400 tons as against 62,000 tons.

### Correction

On page 985 of THE IRON AGE of April 28, it was stated that imports of tin plate in March totaled 2529 gross tons, "or the equivalent of 566,600 base boxes of 100 lb. each." It should have read 56,600 base boxes.

A. M. Byers Co., Pittsburgh, had net loss in the quarter ended March 31 of \$229,138, compared with a profit of \$49,255 in the first quarter last year.

# Foreign Steel Being "Dumped" Here, Declares E. G. Grace

Bethlehem's President Says Low Prices Are Serious Menace—Decline in Company's Business Arrested

IMPORTS of foreign steel into the United States are a very serious factor in the present business situation, said Eugene G. Grace, president, Bethlehem Steel Corp., to representatives of the press last Thursday afternoon. He declared it to be his opinion that the low prices at which steel from foreign countries is being sold in the United States constitute "dumping" under the provisions of the Tariff Act, but that Washington authorities were doing nothing about the matter, although the American Iron and Steel Institute and several steel companies have protested.

Mr. Grace said he could not understand why some of the labor leaders were not making an issue of foreign "dumping," which, he believed, was not confined to steel, but affects many other products. He said that work is being taken away from American labor.

He said that the low prices at which steel is being sold at seaboard makes it possible to pay freight to some inland points, a condition that has not usually existed in the past. Judging from certain cases which have come to his attention, Mr. Grace thought that a European production cost of \$10 to \$11 a ton would be necessary to enable foreign mills to sell here at the prices which have been quoted. He did not believe that any such low cost is possible, and if products are being sold below cost there is a violation of our anti-dumping act. He said that the combination of depreciated currencies abroad and the low rate of steel operations in the United States makes the selling of foreign steel here a particularly disturbing problem.

The steel industry, he believes, is at least entitled to a tariff that will offset the depreciation of foreign currencies, but he added that we have enough laws now to give the steel industry considerable relief if such laws were enforced.

#### Sees Business Decline Arrested

Asked about the future of business, he said he would not attempt to make any predictions, but he said that the downward trend of steel business has apparently been arrested, as during recent weeks orders have been holding at a level instead of continuing to decline. He derives considerable encouragement from this sign, it being the first time in months that he had been able to make such a statement.

He would not say anything definite about the possibility of a further cut

in steel mill wages, but admitted that the executives of Bethlehem had naturally discussed the subject.

He approved President Hoover's recent appeal to the Governors' Conference stressing the need of lower cost in government—national, State and local. He said that lower governmental cost is fundamental to business recovery.

## Pig Iron Imports Are Under Investigation

WASHINGTON, May 3.—Agents of the Bureau of Customs, Treasury Department, have begun an investigation to determine whether English and Dutch pig iron is being "dumped" in the United States.

Charges of dumping were made last week by different sources, including the Chamber of Commerce of Port Henry, N. Y., Boston organizations and others.

Instructions have been given the bureau agents by Commissioner F. X. A. Eble to report on findings they make. Should they be considered sufficiently convincing, agents in England and the Netherlands will seek to learn selling prices in those countries.

Dumping consists of selling in export markets at less than the home market value. Where there is no home market, the price at which sales are made in other world markets is used, and if it is higher than the price at which the iron is sold in the United States, a dumping duty may be assessed. It may also be applied if imports are shown to injure or to threaten injury to a domestic industry.

No formal complaint has been filed regarding alleged dumping of steel.

## Lehigh Valley Railroad To Buy Locomotives

WASHINGTON, May 5.—The Lehigh Valley Railroad will purchase new locomotives out of funds from the \$1,500,000 Reconstruction Finance Corporation loan approved last Wednesday by the Interstate Commerce Commission. The carrier will expend \$278,000 for initial payments on the locomotives. It reported to the commission that it believes that the economies which can be effected through use of the new locomotives amply justify their purchase, notwithstanding the present condition of the carrier's finances.



## ▲▲▲▲ OFF THE ASSEMBLY LINE ▲▲▲▲



# Ford Increasing Production Schedules; Curtailment in High-Price Class

DETROIT, May 2.

**T**HAT a constantly increasing proportion of automobile sales is being made in the groups priced under \$1,000 is indicated by reports from various companies. Despite the depression, Ford is expected to have little, if any, trouble selling all the cars it can produce during the next several months. Chevrolet sold 19,672 new cars during the second 10-day period of April, raising its total for the first 20 days of last month to more than 38,000 cars, by far the best showing since last August. Plymouth production continues unabated at about 25,000 units a month. Going from the light car field to the middle-price class, one finds a growing proportion of Buick's retail demand for its 32-50 model at \$995. Of course, this is due to the fact that Buick is spending a million dollars on an advertising campaign in behalf of this smallest car of its current series, realizing that the public is tightly holding its purse strings and that price is perhaps the dominant factor in motor car sales at the moment. In the quality field output is declining in contrast with the expansion of operations by small car makers. Two companies are not assembling any cars at the present writing and the report is that one of them will not resume manufacture until June, despite the fact that normally May is one of the big production months of the year.

### Ford Production Accelerated

There are many signs pointing to acceleration of Ford activities as rapidly as possible. Ford has been pushing sheet and strip mills for rush shipment of materials recently ordered; those mills in a position to make quick deliveries therefore are getting most of the business. The action in the case of a sheet maker

Ford's production of V-eight motors has passed 1000-a-day mark.

\* \* \*

Chevrolet sold 38,000 new cars in first 20 days of April and 147,000 used cars from March 1 to April 20.

\* \* \*

Ford is pushing sheet and strip mills for rush delivery on recent orders.

▼▼▼▼

is a good example. Ford placed some full-finished tonnage on Wednesday, insisting on its being laid down at the Rouge plant the following Monday morning. The mill said that this was an impossible schedule to meet and finally got Ford's purchasing department to agree to a week's extension of time. A few steel orders, including strip steel for frame stock, came through in the past week, but the total volume was small. A local body builder shipped about 1700 Ford bodies last week to branch assembly plants; about two-thirds were passenger and the remainder commercial car bodies. So far as the frame plant of the Murray Corp. is concerned, it is turning out some Ford frames, but not in large numbers. It is not expected to benefit substantially from Ford operations until production at Rouge reaches 2000 cars a day, as up to that point Ford's own frame department can take care of requirements.

Having reached its immediate objective of turning out 1000 units a day, Ford now is striving to raise production to 2800 by the middle of May. The Ford program calls for an output during the remainder of this year of a minimum of 550,000 cars,

with the possibility that production may go as high as 700,000. If only the minimum is attained, Ford working five days a week would have to make an average of over 3000 cars a day.

That Ford's drive to regain its leadership in the industry is not to go unchallenged beyond its present competition is indicated by the fact that one of the most powerful companies in the industry is planning on offering in the near future a straight eight at a price said to be under the level of Ford's V eight.

With the spring selling season now well advanced, Ford is eager to make deliveries as quickly as possible in order to hold orders now on its books; this is one reason why production is being pushed so vigorously. Some Ford suppliers, including a local company furnishing steering gears, have not yet had any volume releases. What Ford's expansion just now means to the city of Detroit is realized when it became known recently that its payroll is close to a million dollars a day. No major steel purchases by Ford are likely to be made until after the middle of May.

### Chevrolet to Make 50,000 Cars in May

Chevrolet's contemplated May production is now in excess of 50,000 cars. Since March 1, when an intensive used car campaign was opened by Chevrolet, dealers sold (up to April 20) 147,000 used cars. This is another example of the trend of the times toward economy. The large gain in new car sales by Chevrolet is due to several factors—an aggressive merchandising campaign, the regular seasonal upturn, the stimulation of a price reduction, the benefit derived from General Motors exhibits early in the month and the appearance

of the new Ford car, which released considerable buying. Chevrolet's gray iron foundry at Saginaw, which makes cylinder blocks, is scheduled for a five-days-a-week performance all of this month, unless present plans are suddenly altered. Because production has not been as high this year as was estimated last fall, pig iron stocks laid down by water at the Saginaw plant at that time will not be exhausted until some time this summer. Saginaw Malleable division of General Motors is said to have operated only seven days last month, but has a much better schedule for May. This foundry, which supplies most of the malleable castings for General Motors, operated at capacity for months, but its stocks accumulated as car production fell below expectations. The slack program last month enabled it to cut down its inventory perhaps 5000 to 6000 tons.

In the consolidations which are taking place in General Motors, it is expected that Flint will become an important center for the manufacture of parts as well as cars. This is due to the fact that General Motors has expended more money there than in other cities for residential development for employees, its investment for this purpose running into the millions. General Motors authorities at Lansing have denied stories that either the Oldsmobile or Fisher Body plants are to be removed from that city.

#### Motor Company Profits Small

First quarter financial statements of motor car makers are rather drab affairs. General Motors earned 17c. a share, against 61c. in the same quarter last year, and Graham-Paige showed a small profit. Otherwise the figures have all been on the wrong side of the ledger. Chrysler has not published its showing, which it is believed will reveal a profit.

Ford of Canada has started making the V-eight, having a program of 5000 cars for May. It has been getting all of its motors from Rouge, but shortly will begin manufacturing its own units. It has proposed to Ford of England that it make the V-eight for the latter's sales territories in various part of the world and in return give the English company the right to sell bantam Fords in Canada.

### Labor Leader Warns of Unemployment Growth

William Green, president of the American Federation of Labor, has issued the following warning regarding unemployment based on reports received from affiliated organizations throughout the United States:

"Union unemployment reports in April show a new danger: Industrial unemployment is increasing at the

peak of the usual spring busy season. Never before in the five years of our reports has unemployment increased in April—not even in the two depression years just past.

"This new rise is of the greatest significance. We cannot count on any improvement from industrial gain in the near future, but we may be faced with a growing unemployment problem. Obviously, we have yet failed to turn the tide toward economic recovery. Only by putting people back to work to create wealth and earn their living can we put industry on a stable foundation. When unemployment increases we cannot look for industrial improvement. It is a warning to make ready relief and public works. We are passing through one of the most critical periods in the depression. The next two months will test whether the Government reconstruction measures can bring about a start toward business recovery. Business hangs on buying power; and unemployment is cutting buying power to still lower levels.

"It is no longer possible to meet unemployment by relief measures alone. Already cities are reporting the failure of funds. Several report funds already out, others expect their relief money to last until May, June or August; very few have enough for the full year. There is only one way to give men enough work to keep body and soul together and at the same time stimulate buying: Divide work time among those who need work by shortening work hours.

"President Hoover is reported as convinced that the five-day week plan will become a necessary principle in the economic recovery of the country. A universal five-day week would afford work for a large number of unemployed."

### Maryland Rules Out Use of Foreign Steel

The Maryland State Purchasing Agency and the Maryland State Highway Commission have ruled that foreign steel will not be acceptable on their work in future. This follows a similar decision in New Jersey. The Washington and Baltimore groups of the Concrete Reinforcing Steel Institute have been active in discouraging the use of imported steel, particularly on Federal, State and municipal work. No foreign reinforcing bars are to be used on Washington work, and the Public Improvement Commission of Baltimore has specified domestic steel on contracts under its jurisdiction. Efforts in policing the New York State situation have resulted in several reinforcing bar contracts previously awarded to foreign steel fabricators having been re-awarded to institute members, apparently because the foreign steel did not comply with the open-hearth specifications.

### Gray Iron Castings Output Lower in March

Production of gray iron castings declined slightly in March and there was a more noticeable decline in new business, according to the monthly report of the Gray Iron Institute. The production basis was practically the same as in January. March production was at 37.1 per cent of normal capacity, compared with 39.4 per cent in February. New business was 30.4 per cent of normal, against 37.4 per cent in February. Unfilled orders were virtually the same as in the previous month.

Production in the Eastern district including New England, New York and New Jersey was 34.1 per cent of normal in March, a decline of about two points. There was a five point decline to 36.7 per cent in Pennsylvania, Michigan, Ohio and Indiana. Wisconsin, Illinois and the territory west of the Mississippi River increased slightly to 40.1 per cent, the Chicago district increased about two points to 41.4 per cent.

One foundry reported the business outlook good, 31 fair, 35 poor and 39 bad.

### Ask Increase in Duty on Cotton Ties

WASHINGTON, May 3.—Domestic manufacturers have applied to the Tariff Commission for an increase in the duty of ¼c. per lb. on cotton ties. The applicants are the Atlantic Steel Co., Atlanta, Ga.; Connors Steel Co., and Tennessee Coal, Iron & Railroad Co., Birmingham; Carnegie Steel Co., and Pittsburgh Steel Co., Pittsburgh.

Imports of cotton ties into the United States in 1931 totaled 8718 gross tons. They come from Germany, 3088 tons; France, 2437 tons; United Kingdom, 1641 tons; Belgium, 1432 tons; Netherlands, 120 tons. The latter probably originated in Germany. The heaviest entry was at Galveston, 4874 tons, while the next to largest receipts were entered at New York, 1569 tons.

### Steel Castings Output Up in March; Orders Off

WASHINGTON, May 2.—March orders for commercial steel castings totaled 16,593 tons, against 17,015 tons in February, according to reports received by the Bureau of the Census from 130 establishments. Bookings in March consisted of 12,588 tons of miscellaneous castings and 4005 tons of railroad specialties. The March production was 20,433 tons, an increase of 1674 tons, and consisted of 16,063 tons of miscellaneous castings and 4370 tons of railroad specialties.

# Pig Iron Output in April Declines 8.9 Per Cent

**A**PRIL production of coke pig iron totaled 852,897 gross tons, compared with the March total of 967,235. The average daily output in April, at 28,430 tons, declined 8.9 per cent from the March figure of 31,201.

Furnaces in operation on May 1 totaled 60. These were making pig iron at the rate of 27,730 daily, against the same number on April 1, with a daily operating rate of 29,135 tons.

There were few furnace changes during the month. Three furnaces were blown in and three blown out or banked. The Steel Corporation registered a net gain of two furnaces by starting three Ensley stacks of the Tennessee Coal, Iron & Railroad Co. and taking off one Carrie furnace of the Carnegie Steel Co. Two merchant furnaces were blown out or banked, one in the Pittsburgh district and one in the Lehigh Valley.

Production of Coke Pig Iron and Ferromanganese

	Gross Tons Pig Iron*		Ferromanganese†	
	1931	1932	1931	1932
January	1,714,266	972,784	14,251	11,250
February	1,706,621	964,280	19,480	4,016
March	2,032,248	967,235	27,899	4,900
April	2,019,529	852,897	25,456	481
May	1,994,082	.....	23,959	.....
June	1,638,627	.....	11,243	.....
½ year	11,105,373	.....	122,288	.....
July	1,463,220	.....	17,776	.....
August	1,280,526	.....	12,482	.....
September	1,168,915	.....	14,393	.....
October	1,172,282	.....	14,739	.....
November	1,103,472	.....	14,705	.....
December	980,376	.....	15,732	.....
Year	18,275,165	.....	212,115	.....

\*These totals do not include charcoal pig iron. The 1930 production of this iron was 26,580 gross tons.  
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Gross Tons		
	1930	1931	1932
January	91,209	55,299	31,380
February	101,390	60,950	33,251
March	104,715	65,556	31,201
April	106,062	67,317	28,430
May	104,283	64,325	.....
June	97,804	54,621	.....
½ year	100,891	61,356	.....
July	85,146	47,201	.....
August	81,417	41,308	.....
September	75,890	38,964	.....
October	69,831	37,848	.....
November	62,237	36,782	.....
December	53,732	31,625	.....
Year	86,025	50,069	.....

Production by Districts and Coke Furnaces in Blast

	Production (Gross Tons)		May 1		April 1	
	April (30 Days)	March (31 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
<b>New York:</b>						
Buffalo	78,502	80,052	5	2,615	5	2,580
Other New York and Mass.	.....	5,476	0	.....	0	.....
<b>New Jersey</b>	.....	.....	0	.....	0	.....
<b>Pennsylvania:</b>						
Lehigh Valley*	25,868	27,743	2	820	3	895
Schuylkill Valley	.....	.....	0	.....	0	.....
Susquehanna and Leba- non Valleys	9,831	11,293	1	330	1	365
Ferromanganese	.....	.....	0	.....	0	.....
Pittsburgh District	136,525	178,132	7	3,445	9	4,600
Ferro. and Spiegel	7,330	4,906	1	245	1	160
Shenango Valley	11,512	15,350	1	385	1	335
Western Pennsylvania	17,460	20,868	1	580	1	670
Ferro. and Spiegel	.....	.....	0	.....	0	.....
<b>Maryland</b>	37,864	36,567	2	1,260	2	1,180
<b>Wheeling District</b>	79,964	79,893	4	2,565	4	2,575
<b>Ohio:</b>						
Mahoning Valley	69,694	81,269	5	2,215	5	2,560
Central and Northern	71,321	79,220	6	2,470	6	2,665
Southern	18,845	20,275	2	630	2	800
<b>Illinois and Indiana</b>	167,547	199,469	11	5,555	11	6,165
Mich., Wis. and Minn.	22,638	24,194	2	735	2	780
Colo., Mo. and Utah	21,411	23,961	2	715	2	770
<b>Virginia</b>	.....	.....	0	.....	0	.....
<b>Kentucky</b>	9,347	10,453	1	310	1	340
<b>Alabama</b>	70,838	68,114	7	2,855	4	1,695
Ferromanganese	.....	.....	0	.....	0	.....
<b>Tennessee</b>	.....	.....	0	.....	0	.....
<b>Total</b>	852,897	967,235	60	27,730	60	29,135

\*Includes spiegeleisen.

Merchant Iron Made, Daily Rate

	1931		1932	
	Tons	Sept.	Tons	Sept.
Jan.	9,416	.....	8,985	.....
Feb.	11,332	.....	7,051	.....
March	11,481	.....	5,758	.....
April	13,439	.....	6,778	.....
May	13,212	.....	.....	.....
June	11,209	.....	6,256	.....
July	12,012	.....	7,251	.....
Aug.	9,569	.....	7,157	.....

## Insuring a Deep Chill on Iron Rolls

An application for patents on cromonite chill has been filed by Continental Roll & Steel Foundry Co., East Chicago, Ind. This metal has been developed to show a real defined chill with a gray iron center for the manufacture of cast rolls for steel mill use. The Continental Roll & Steel Foundry Co. found that the use of high percentages of nickel ordinarily makes it extremely difficult to produce a real chill at any great depth. This objection has been overcome by developing a special composition and specific furnace practices. It has been found

practicable to achieve very closely any desired hardness between 65 and 95 Shore. This hardness is maintained throughout the total chill depth. Cromonite is said to give greater surface improvement in the rolled product and to reduce roll wear materially with fire-racking reduced to the minimum.

A recent application in working rolls for four-high hot strip mills, with rolls approximately 80 Shore, is reported to have resulted in longer use between roll changes. Cromonite rolls, having a Shore hardness of 90, have also been used on four-high hot strip mills with excellent results and in cold strip mills where it had been customary to use forged and hard-

ened steel rolls. These rolls are particularly adaptable to any mill where water is used.

Orders for business furniture placed in March were valued at \$794,355 against \$751,088 in February, according to reports received by the Bureau of the Census from 36 producers. Orders for shelving furniture reported by 16 manufacturers were valued at \$264,669, compared with \$212,265.

Production of babbitt metal in March rose to 1,595,457 lb. from 1,577,017 lb. in February, according to reports received by the Bureau of the Census from 40 manufacturers.



# ... PERSONALS ...

J. FREDERIC BYERS has been elected chairman of the board of A. M. Byers Co., Pittsburgh, succeeding his brother, the late E. M. Byers. He is a son of the founder of the company and has been identified with it continuously since his graduation from Yale University in 1904. Since 1905 he has been vice-president. Mr. Byers is a director in the Westinghouse Air Brake Co., Wilmerding, Pa.; the Union Switch & Signal Co., Swissvale, Pa., and Union Trust Co., the Union National Bank and the Union Savings Bank, all of Pittsburgh.

CHARLES S. BELSTERLING has been appointed vice-president in charge of traffic of the United States Steel Corp. He started his services in the Philadelphia office of the A. & P. Roberts Co., which owned and operated the Pencoyd Iron Works, Pencoyd, Pa. Upon the merger of that company with the American Bridge Co., he became associated with the latter company and later was made general commerce attorney of the United States Steel Corp., which position he has held since 1914. R. E. ZIMMERMAN has been appointed assistant to the president of the United States Steel Corp. at New York. Mr. Zimmerman has for many years been associated with the American Sheet & Tin Plate Co., Pittsburgh, occupying latterly the position of assistant to the vice-president and director of the research laboratory of that company, a subsidiary of United States Steel Corp.

CARL V. DODGE, for the last year general manager of roll and casting sales for the United Engineering & Foundry Co., Pittsburgh, has been elected a vice-president of the company. FRANK F. BROOKS, president of the First National Bank at Pittsburgh, has been made a director of the United company. Mr. Dodge en-

tered the employ of the United company in 1904 as a shipping clerk in the chilled roll department at Vandergrift, Pa. He later served as foreman of the cleaning floor and order clerk, and in 1913 was transferred to the Pittsburgh office as a steel casting and roll salesman. During the war he headed the steel castings sales department of the company. When the casting and roll sales departments were consolidated in 1921 he became assistant manager of sales, a position he held until the death of the late William Gardner a year ago.

NICHOLAS DREYSTADT has been appointed works manager of the Cadillac Motor Car Co., Detroit, to succeed A. U. WIDMAN, who recently resigned. For the past six years he has been general parts and service manager of the company. Acquiring his education in Germany, Mr. Dreystadt received his early mechanical training in European automobile plants. He came to this country in 1912 and after four years of general shop work joined the Cadillac retail sales force in Chicago. In 1918 he became Cadillac shop superintendent in that city and later was appointed service manager of the Chicago branch. He was called to Detroit in 1926 to become head of the parts and service department, in which position he has made an outstanding record.

A. O. BREDEMERE, who has been identified for the past 18 years with the National Acme Co., Cleveland, has resigned as manager of the Detroit office, which will enable him to devote his entire time to other interests.

W. J. SULLIVAN, for many years in the president's office, United States Steel Corp., New York, has resigned and can be communicated with at Box 211, Trinity station, New York.

MYRON C. TAYLOR, chairman of the board of the United States Steel Corp., has sailed for Europe, to become acquainted with the corporation's European business.

D. D. HULL, JR., since 1917 vice-president of the Virginia Iron, Coal & Coke Co., Roanoke, Va., has been elected president and general manager. He was graduated in law from the University of Virginia and, after practicing at Pulaski and Bristol, Va., became general counsel for the Virginia company in 1903.

E. S. CULBERTSON has been elected president of the Ironton-Russell Bridge Co., Ironton, Ohio.

WALTER B. HOLDER has been appointed manager of the Boston office of the Barber-Greene Co., Aurora, Ill., manufacturer of materials handling machinery. Mr. Holder has been with the Barber-Greene Co. since 1926, most of the time as head of the coal-handling line. Prior to his connection with the Barber-Greene Co. he was for 11 years engaged in the designing of coal elevating and conveying machinery.

LOUIS C. MARBURG, Marburg Brothers, Inc., importer of machinery, New York, left May 4 for five or six weeks in Germany.

J. H. FITCH, JR., has resigned as vice-president and treasurer of the Newton Steel Co., Detroit. He had been associated with the company since its inception in 1919.

JOHN P. FERRIS, chief engineer, Oilgear Co., Milwaukee, has been granted indefinite leave of absence in order to accept the position of assistant secretary of the Wisconsin Governor's Council and secretary of the Council's committee on business economics, with headquarters in the State capitol at Madison. Mr. Ferris has resided in



J. F. BYERS



C. S. BELSTERLING



R. E. ZIMMERMAN



C. V. DODGE



N. DREYSTADT

Wisconsin since 1902. He studied engineering at the University of Wisconsin after having gained considerable practical experience in the World War and in private industry. He was appointed assistant chief engineer of the Oilgear Co. in 1923 and was promoted to chief engineer in 1929.

♦ ♦ ♦

F. T. CRANE, formerly Chicago district sales manager for the J. A. Fay & Egan Co., Cincinnati, has been promoted to the sales managership. For the past few years he has been in charge of the school and government sales division.

♦ ♦ ♦

G. P. BLACKISTON has been appointed sales promotion manager of the Kron Co., maker of industrial scales, Bridgeport, Conn.

♦ ♦ ♦

CHARLES A. McCUNE, formerly research director of the American Chain Co., and later of the Welding Engineering & Research Corp., has joined the Industrial Publishing Co., Cleveland, as vice-president and technical director. Mr. McCune is a past president of the American Welding Society and of the International Acetylene Association.

♦ ♦ ♦

MAX RACHWALSKY, of Georg Stenzel & Co., machine tool dealers, Berlin, Germany, has returned to Germany after a four weeks' stay in the United States.

♦ ♦ ♦

DUDLEY H. SMITH, 221 East Twentieth Street, Chicago, has joined the sales organization of the Geometric Stamping Co., Cleveland.

♦ ♦ ♦

H. H. KRAUSE, of the National Screw & Mfg. Co., has been elected president of the Purchasing Agents' Association of Cleveland. Other new officers are RALPH SWEENEY, Allyne Ryan Foundry Co., and EDWARD MANNING, Fisher Body Co., vice-presidents, and GEORGE COLLIER, Cleveland Automatic Machine Co., secretary-treasurer.

♦ ♦ ♦

C. E. ALLEN, commercial vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, who has charge of the company's various departments devoted to the manufacture and sale of domestic electrical appliances, has been elected a vice-president of the American Management Association and will be in charge of its consumer marketing division.

Bureau of Labor Statistics, Washington, reports that building permits issued in 355 identical States of the United States show an increase of 10.1 per cent in March over February. The estimated cost of all buildings for which permits were issued in these States for March was \$45,390,806, against \$41,215,809 in February.

## OBITUARY

J. R. DAVIES, a former managing director of Richard Thomas & Co., Ltd., of England, died April 28, aged 71 years.

♦ ♦ ♦

ELMER O. LANGE, production manager, South Side Malleable Casting Co., Milwaukee, until illness compelled his retirement in 1930, died April 29, aged 36 years. He was a brother of Albert C. Lange, president, Crucible Steel Casting Co., Milwaukee, and Walter W. Lange, president, South Side Malleable Casting Co., both concerns having been founded by their father, Fred A. Lange.

♦ ♦ ♦

FRANK W. DIEHL, vice-president, Milwaukee Gear Co., Milwaukee, died April 28 after an illness of eight months. He was born in Milwaukee in 1878 and before becoming associated with the Gear company, served 10 years as assistant superintendent, National Brake & Electric Co., Milwaukee.

♦ ♦ ♦

CHARLES C. PFLITTNER, formerly superintendent, Barton Axle Co., Barton, Wis., and widely known as a designer of automotive parts, died April 28 as the result of an accident. He was 48 years of age.

♦ ♦ ♦

JOSEPH A. KELLY, one of the founders and since 1914 president of the Reliance Steel Casting Co., Pittsburgh, died at his home in that city on April 25, aged 75 years. Mr. Kelly was born at Sharpsburg, Pa., and attended the Newell Institute in Pittsburgh. He was identified for many years with the Reliance Tube Co. of Brackenridge, Pa., later acquired by the Allegheny Steel Co. He helped to organize the Reliance Steel Casting Co. in 1910, and in addition to his work with this organization he had served for many years as vice-president of the Vulcan Crucible Steel Co., Aliquippa, Pa. Mr. Kelly was also president of the Pennsylvania Bank and Trust Co., Pittsburgh, and was also prominently identified with civic and religious af-

fairs in the city. He was a charter member of the Engineers Society of Western Pennsylvania.

♦ ♦ ♦

ROBERT MIEHLE, inventor of the printing presses bearing his name, died at Chicago April 23, aged 72 years. Mr. Miehle was born at Chicago and after serving an apprenticeship began work as a journeyman pressman when he was 21 years old. He took out his first patent in 1884. He retired from active research work in 1914 and since that time had been connected only in a consulting capacity with Miehle Printing Press & Mfg. Co.

♦ ♦ ♦

WILLIAM J. POWERS, sales engineer of the Swind Machinery Co., Philadelphia, died on April 25 after a long illness. He had been associated with the company for 19 years.

♦ ♦ ♦

DAVID J. GRANGER, a member of the firm of Sterling Drop Forge Works, Chicago, died on April 15.

♦ ♦ ♦

PAUL RICHARD KUEHNRICH, a founder and later managing director of Darwin's, Ltd., Sheffield, England, died at his home in that city on April 28, aged 71 years. A native of Germany, he entered the British steel trade when he was 16 years old. Mr. Kuehnrich was managing director of the Universal Rustless Steel Corp. at the time of his death.

### Automobile Production Up Slightly in March

WASHINGTON, May 3.—The March production of motor vehicles in the United States totaled 118,959, against 117,418 in February. The March output included 99,325 passenger cars and 19,560 trucks. In the first three months of 1932 motor vehicle production in the United States totaled 355,721, against 668,193 in the corresponding period of last year.

Canadian production in March was 8318, against 5477 in February.

### Fabricated Plate Bookings Lower

WASHINGTON, May 3.—Orders for fabricated steel plate in March totaled 12,564 tons, against 17,755 tons in February, according to reports made to the Bureau of the Census by 51 identical manufacturers. Miscellaneous bookings accounted for 11,777 tons in March. Orders in the first quarter of 1932 were 47,932 tons, against 83,012 tons in the corresponding period of last year.

### Putting the Question Mark to Work—to Tap the Reservoir of Experience

THIS feature unfortunately was forced out of the issue this week because of the extensive report of the American Welding Society's annual convention. The questions and answers scheduled for this week will appear in the issue of May 19 and regularly thereafter.

# • • EDITORIAL

## A Price That Must Be Paid

**C**REDIT is builded on confidence. No one will lend or invest unless reasonably sure of the return of his principal. Capital is notoriously timid and, at a time when fear lurks in every corner, will seek safety at the sacrifice of every other consideration. That is why cash in hand has been bringing a premium and pressure for liquidity has become self-perpetuating. That is why the safety of capital must be assured before the process of liquidation can be brought to a halt.

The Federal Reserve System is wisely assisting the banks, the chief repositories of capital, in achieving liquidity. When, through purchases of Government securities, the banks are put in a position of unquestioned security, their fears should subside and confidence should revive.

But, as Dr. Edie points out in his article elsewhere in this issue, bank liquidity of itself is no guarantee of the success of the Federal Reserve program. Legislators, industrialists, in fact all of us, must lend a hand in an effort to bring capital out of hiding.

The automobile industry is already doing its part by making a determined drive to revive consumer buying. This campaign will succeed provided new developments do not upset reviving confidence. One of the greatest dangers is that capital will get another case of nerves because of legislative ineptitude.

It is all very well to minimize the importance of balancing governmental budgets in a country of such evident wealth in natural resources and human energies, but these are extraordinary times. Capital judges governmental administration in terms of the management of private enterprise. It will not be coaxed out of hiding so long as public debt is piled on public debt. It will not reenter the channels of trade until all of its exaggerated fears are allayed.

If no other argument for public economy existed, this one alone would suffice. The price of restoring the confidence of capital must be paid.

## Combat Defeatism

**T**HERE is abroad an attitude of defeatism that should be combatted. Just because many can see nothing but black clouds ahead is no reason for all of us to drift without effort to shape our course. Large numbers were wrong in 1929. Some of the forecasters, professional and otherwise, whose vision then was rosy are probably now looking through the other end of the spectrum.

Let us remember that in the metal-working industry we have been consuming for some months only one-third of our normal needs. And these so-called normal needs

are not those of recent years but the average rate shown over, say, twenty years. In steel we dropped to 30 per cent of normal. It may be that the normal rate may not again be reached for months, but one-third of that is unthinkable over any long period.

For several weeks an expansion has been under way. Any sustained move in that direction will help to eradicate the pessimism. Though even twice the recent business volume is doubtless below mere wear and tear needs, a doubling of current activity would be welcome to any business enterprise. Even profits are likely today under a two-thirds of needs regime (40 to 45 per cent of capacity), so why dwell on the blackness of the outlook, which is, after all, more or less conjecture?

• • •

## Foreign Steel Imports Arousing American Trade

**A** CABLE to the New York *Herald Tribune* from Brussels, printed Monday morning, stated that "the Belgian steel industry is hopeful of an increase in its exports to America as a result of the \$2 a ton increase by American producers." The dispatch also states that a 3000-ton order has been booked for delivery to the Middle West, a section that has not hitherto experienced much foreign steel competition because of high railroad freight rates from seaboard. In all probability the movement will be by water to some Great Lakes port.

Belgium has recently been the largest exporter of steel to the United States. Its export trade is bound to be adversely affected by higher duties in Great Britain, and renewed efforts undoubtedly will be made to increase its sales to this country.

Meanwhile, American steel interests are becoming thoroughly aroused over the situation, which has become acute because of the low prices at which imported steel is sold, there being as much as \$14 to \$16 a ton difference at Atlantic ports. Jobbers are alarmed over their inability to meet this competition, the Concrete Reinforcing Steel Institute has taken a hand in the situation, and the president of the Bethlehem Steel Corp. last week declared that the low prices were clearly a violation of the anti-dumping provision of our tariff law.

The president of the Concrete Reinforcing Steel Institute has recently stated in addresses to members that "it is recognized that a certain amount of foreign bars must be accepted in the United States as our share of preserving a trade balance, but the problem is to prevent the imported steel from ruining the domestic market."

Some progress is being made in the anti-importation effort. United States authorities have excluded foreign



# C O M M E N T . .

steel in the Federal building program, New Jersey has ruled out foreign steel on State work and Maryland has just made a similar decision.

Probably no relief can be expected from this Congress in the matter of higher tariffs, while the Hawley bill, now before Congress, which is designed to equalize the duties on products shipped from countries whose currency has depreciated, would not affect the bulk of our steel imports, these coming mainly from countries that are still on the gold basis. Perhaps the most effective weapon is that employed by the Concrete Reinforcing Steel Institute—a "policing" of markets to prevent by persuasion, if possible, the use of imported material on the ground that it is taking work away from American industry and labor at a time when every dollar spent at home contributes to relief of a dire situation.

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## Taxes Up, Income Down

**E**XTRAVAGANCE, carelessness, political expediency or indifference must have characterized many of the decisions on appropriations when for the 1932 fiscal year the estimated outgo shows an increase in five years of 63 per cent for the major departments and commissions. One has the right to ask why disbursements in the categories for the current year point to a total of 3,195 millions of dollars when a total of 1,964 millions sufficed in 1927. The departments of agriculture, but not including the Farm Board, and the post office, treasury and war departments together represent 629 millions of the increase and the Veterans' Bureau, without touching on the adjusted service certificate fund, accounted for 393 more millions of the increase.

Aside from the fact that a part of the increase may be through enlarged public works projects, undertaken in response to the popular demand to create employment, it remains that enlarged expenditures mean larger taxes. These in turn fall upon shrunken incomes, both corporate and individual. The burden, therefore, is not merely increased in proportion to the increased public expenditure, but is again enlarged by comparison to the decreased base upon which it is imposed.

The tax burden upon a ton of steel, for example, which normally before the depression may have averaged one dollar, is now approximately four dollars, due to decreased volume. The entire tax burden of this country, federal, State and local, will this year amount to 25 to 30 per cent of the collective national income, according to a recent estimate by Dr. Edie.

Industry and business are in agreement that a material reduction of the tax burden, resulting from economy in

government, will help to hasten recovery. A number of companies have taken initiative in forming public opinion on this subject.

The S. S. Kresge Co., for example, has adopted a novel, but effective, means of arousing people to action on this subject, enclosing with its financial statement to stockholders a slip reading, in part, as follows:

"A quicker return to prosperity is, in our judgment, being impeded by the staggering cost of government and governmental obligations, national and local. If you can help create an awakened and active public sentiment for decreased taxation and public spending, the beneficial effects of such action should be quickly apparent in the general advance toward prosperity."

Action of this kind on the part of industrial firms in general and individual citizens in particular will go a long way toward keeping holders of industrial stocks, now numbered in seven figures in this country, and taxpayers reminded of what they can do to help reduce this burden which rests not only upon industry, but upon every American.

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## The Goldsborough Bill

**T**HE passage by the House of Representatives of the Goldsborough bill "for restoring and maintaining the purchasing power of the dollar" would have been less of a surprise if the Federal Reserve authorities had not already inaugurated a vigorous policy to achieve the same end.

The chief defect of the bill is that it makes it mandatory to restore a particular price level—that which prevailed from 1921 to 1929. This provision not only reflects a naive faith in the power of legislation to fix prices but also a failure to appreciate the wide discretion necessary to those regulating a most delicate mechanism. That our credit machinery can be controlled—within limits—has been demonstrated by central banking experience, but effective control implies astute and trained leadership, unhampered by legislative meddling.

Federal Reserve authorities can take measures to expand or reduce the volume of credit, but they cannot guarantee that such action will raise or lower prices to predetermined levels. In fact, conditions might easily arise in the complex financial and commercial relationships that constitute world business which would make efforts to restore pre-panic prices disastrous.

"When the road is still rough it is a poor time for a back-seat driver to order 'full speed ahead.'"

## ... LETTERS TO THE EDITOR ...

### Wanted: Purchases of Capital Goods

Editor, *The Iron Age*:

COULD you send me a dozen copies of the editorial page of your issue of March 24, 1932, particularly that part where it says the "Railroads Should Give as Well as Take." I think it is very well founded.

It has been my observation that the only difference between "boom" business and "bum" business is the amount of money that flows into the purchase of capital goods and as long as the only buying is for consumption goods business will be bad. It requires enterprising and venturesome men to start putting funds into capital goods, and when we do that the percentage of operations of the steel industry will rise and other business men will become more enterprising and it won't be long before the railroads will be on a profitable basis again. When they are, the majority of other businesses will be profitable and unemployment will disappear and the government will be able to obtain enough income to pay their going expenses, provided Washington uses some reasonable sense in making appropriations.

G. E. J.

### It Takes Two to Make a Bargain

Editor, *The Iron Age*:

I HAVE read with considerable interest the editorial "Destructive Buying" in your March 3rd issue. Your inference that the buyer is a "bully" imposing on his less muscular fellow (the seller) is rather amusing. Does the buyer have some divine power whereby he can force a seller to take a piece of business at a ridiculous price? Doesn't it still take two people to make a bargain? Has the right to refuse to quote prices below manufacturing costs been taken away from the seller?

With the keen competition we have today should a buyer, like the prominent automobile concern you mention, refuse to place an order at a price on which the supplier could not make a profit? If so, where would he place his orders with everyone admittedly operating at a loss? It is not my idea that purchasing is a benevolent profession, nor that the concern employing the buyer is an eleemosynary institution. Consequently, I would seek your advice in the matter of handling negotiations when each and every manufacturer is falling over himself trying to quote a lower price than his competitor. Would the purchasing agent of the prominent automobile concern deliberately insist on the supplier raising his price? If so, has he the assurance his competitors will do likewise so that he will not be instrumental in raising his company's

cost to a point where they will not be in a position to compete? The buyer can theorize about the welfare of his suppliers, but in the last analysis the welfare of his own company should be his first concern.

The duty of a purchasing agent is to get maximum value for the money he spends. To buy on a price basis alone is naturally foolish. The duties of the sales fraternity are well known. What they lack today more than anything else is intestinal fortitude. There is no good reason for selling materials below cost. The matter is entirely in the hands of the sales managers.

J. B. M.

### "The Product Named—'or Equal'"

Editor, *The Iron Age*:

THE editorial entitled "The Product Named—'Or Equal'" which appeared in the March 17 issue of *THE IRON AGE*, discusses a subject which has given rise to a very wide diversity of opinion, among purchasing agents, both in the public service and in private business. The practice which you condemn is founded upon broad experience and cannot easily be dismissed as unsound. In the following remarks I am submitting a little known side of this controversial subject:

It is safe to assert that most executives engaged in buying or selling would welcome a market in which unfair competitive practices did not exist and where goods could be bought by trade name with complete assurance that such goods were really the best. Unfortunately such a market does not exist and the very qualification which opens the door to trade abuses, affords one of the best safeguards against such abuses.

The use of the words "or equal" in specifications is not a practice of recent development, although the increasing frequency of its appearance may be the result of the present "buyers' market," which is a manifestation of the present business depression.

In this country, the practice has its origin in some of the earliest statutes governing public or quasi-public contracts. To promote economy in public expenditures and to prevent collusion between public officials and business agencies, our laws require that save for certain specific exceptions, all contracts involving the expenditure of public funds must be awarded to the lowest responsible bidder, to be determined by competitive bidding based upon public advertisement. In the evaluation of bids received in response to public advertising, price alone is not the determining factor. Quality—that is, potential serviceability with respect to the purpose to

which the material will be applied, having been established, award is then made to the bidder whose price promises the greatest measure of economy, all factors being considered. Trade names, trade marks or patents do not carry with them any presumption of superiority, when considered in relation to a public contract. Trade names when used in public advertising imply only that articles thus described possess the minimum characteristics capable of satisfying the requirements of the purchasing agency. The above principle has been severely tested and is sustained by numerous legal decisions.

There appears to be no doubt that in the opinion of the courts the inclusion of specific trade names in public specifications without qualification, or without positive evidence that no article other than the one thus described will satisfy the requirements of the specification, affords preferential treatment to those contractors controlling the named article, to the disadvantage of their competitors, and is therefore unlawful.

Since governmental and other public agencies are without power to contract except as such power is delegated to them by law, which at the same time strictly limits their authority, the use of trade names only when qualified by the words "or equal," as prescribed by law, in public contracts is a practice which must be accepted, be it good or bad.

It is not my purpose to discuss the possible merits or demerits of the practice which seems an unavoidable accessory to competitive buying. There is, however, little question but that it has a decided appeal to both buyers and sellers in the present highly competitive market, and is here to stay.

FRANK W. BULLOCK  
First Lieutenant, U. S. Army  
Supply Div'n, O.C.S.O.

Another Surface Combustion tinplate normalizing furnace will be installed in the Sparrows Point, Md., plant of the Bethlehem Steel Co. The furnace is of the continuous walking beam type and will be equipped with high-pressure automatic proportioning burners and hydraulic driving mechanism. Water-cooled and air-cooled chambers in the cooling zone control the grain growth of normalized packs by maintaining the temperature of packs through definite time limits. Over and under firing insure uniform heating of the packs as they pass through the heating zone.

Gears & Forgings, Inc., Cleveland, which is in receivership, is operating its plants as usual. The company informs *THE IRON AGE* that reports of a discontinuance of operations are incorrect and that the business will be conducted as heretofore pending a reorganization of the company's financial structure.

## SUMMARY OF THE WEEK'S BUSINESS

# Pig Iron Production Again Declines; Steel Ingot Output Gains Slightly

April Pig Iron Daily Average Comes Close to Low Point of 1921—  
Steel Price Structure Faces Test of Wage Cuts

PIG iron production touched a new low point in April, the daily rate of 28,430 gross tons having come within striking distance of the minimum output of 1921, which was 27,889 tons a day in July. The April total was 852,897 tons, compared with 967,235 tons in the preceding month, and 2,019,529 tons in April, last year. The daily rate in April was about 8.9 per cent below the March average of 31,201 tons.

There were 60 furnaces in blast on April 1 and the same number on May 1, but during the past month three furnaces went out and three went in. The Steel Corporation put out one and put in three, but this net gain of two was offset by the blowing out of two merchant furnaces.

STEEL ingot production for the country as a whole has shown a further increase of one point this week to 24 per cent of capacity, but the situation is very irregular in that gains at Cleveland, Detroit, Buffalo, Wheeling and Birmingham are, to a large extent, offset by losses at Pittsburgh and Chicago. Increased production is expected at Chicago next week, however, as business there has shown the first real spurt in many weeks and reports from some cities in the Middle West indicate that mild recovery is in progress.

The influence of automobile buying has not been felt to any marked extent except in Detroit, where a considerable portion of recent sheet and strip orders was placed, and at Chicago, which has experienced a substantial improvement in bar orders, principally from the low-priced automobile makers, Ford, Chevrolet and Plymouth. It is apparent that these producers will give the main support to automobile steel production during the summer, as demand for high-priced cars is lagging. One plant in the quality group has shut down, possibly for all of May.

Having attained an output of 1000 cars a day, the Ford Motor Co. now has as its objective a daily schedule of 2800 by the middle of May. The Ford program for the remainder of the year contemplates a minimum production of 550,000 cars, which would mean 3000 cars a day on a five-day week basis. Further steel buying by the Ford company is expected within two weeks. It now appears that the peak of automobile production will come in June at the earliest, but possibly in July or August.

SUCH minor improvement as has occurred in steel mill operations may be attributed in part to scat-

tered orders from sources other than the automobile industry. However, some districts have contributed very little business, tonnage in the New York territory in April having been the smallest of any month in the depression period. At Chicago, rail mills have booked some small orders, including 4000 tons for the Illinois Central, and will be able to operate for 30 days at the present curtailed rate. The Great Northern is inquiring for 10,000 tons of rails.

Structural steel lettings in the week were only 14,150 tons, of which 5500 tons is for a New York office building. A considerable volume of work is pending, however, and much of it may be placed this month.

Tin mill operations have dropped below 50 per cent and may not improve again until can companies have more knowledge of this year's crop prospects.

WAGE cuts by the steel companies, which are expected shortly, will give the price situation its first crucial test. Plans for further advances for the third quarter are being held in abeyance, as some steel companies presumably will be well satisfied to hold present levels against the pressure that may be expected from consumers following wage reductions. Further declines in gold prices for Continental steel and the higher tariffs in Great Britain threaten to add to the competition from foreign steel in American markets. While no formal complaint against alleged "dumping" of foreign steel has been lodged with Washington authorities, an official investigation of pig iron imports is under way, following the filing of "dumping" allegations by Eastern pig iron interests. Eastern Pennsylvania pig iron has declined 50c. to 75c. a ton because of competition of foreign pig iron, some of which is being offered for resale by recent purchasers here, who now find they have no immediate use for it.

A CONDITION akin to demoralization is prevalent in scrap markets, there having been widespread price declines, some of which are attributed to forced liquidation of stocks by dealers who had bought for a rise. Heavy melting scrap is lower at Pittsburgh, Chicago and in eastern Pennsylvania, bringing THE IRON AGE composite price for this grade to \$7.62, a new low level for all time.

THE IRON AGE composite price for pig iron has declined to \$14.22 a gross ton from \$14.35, which was the average throughout April. The finished steel composite is unchanged at 2.087c. a lb.



# ▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

## Pig Iron

	May 3, 1932	Apr. 26, 1932	Apr. 5, 1932	May 5, 1931
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$14.84	\$15.59	\$15.59	\$17.26
No. 2, Valley furnace.....	15.00	15.00	15.00	17.00
No. 2 Southern, Cin'ti.....	13.82	13.82	13.82	14.69
No. 2, Birmingham.....	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*.....	16.00	16.00	16.00	17.50
Basic, del'd eastern Pa.....	16.00	16.00	16.00	17.00
Basic, Valley furnace.....	14.50	14.50	14.50	16.50
Valley Bessemer, del'd P'gh..	17.39	17.39	17.39	18.76
Malleable, Chicago*.....	16.00	16.00	16.00	17.50
Malleable, Valley.....	15.50	15.50	15.50	17.00
L. S. charcoal, Chicago.....	23.17	23.17	23.17	25.04
Ferromanganese, seab'd car- lots.....	\$75.00	\$75.00	\$75.00	80.00

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.  
†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

## Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh..	27.00	27.00	27.00	30.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	30.00
Slabs, Pittsburgh.....	27.00	27.00	27.00	30.00
Forging billets, Pittsburgh....	33.00	33.00	33.00	36.00
Wire rods, Pittsburgh.....	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skeip, grvd, steel, P'gh, lb.,	1.60	1.50	1.50	1.65

## Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.65
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.70
Bars, New York.....	1.95	1.95	1.95	1.98
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.65
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.898	1.898	1.898	1.93
Structural shapes, Pittsburgh..	1.60	1.60	1.60	1.65
Structural shapes, Chicago....	1.70	1.70	1.70	1.70
Structural shapes, New York..	1.86775	1.86775	1.86775	1.90 1/2
Cold-finished bars, Pittsburgh	2.00	2.00	2.00	2.10
Hot-rolled strips, Pittsburgh..	1.40	1.40	1.40	1.55
Cold-rolled strips, Pittsburgh..	2.00	2.00	2.00	2.15

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

## Finished Steel

	May 3, 1932	Apr. 26, 1932	Apr. 5, 1932	May 5, 1931
<i>Per Lb. to Large Buyers:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.20	2.20	2.20	2.15
Hot-rolled annealed sheets, No. 24 Chicago dist. mill....	2.30	2.30	2.30	2.35
Sheets, galv., No. 24, P'gh....	2.85	2.85	2.85	2.80
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	2.90
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.70
Hot-rolled sheets, No. 10, Chi- cago dist. mill.....	1.65	1.65	1.65	1.80
Wire nails, Pittsburgh.....	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh.....	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill.	2.25	2.25	2.25	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh..	\$4.75	\$4.75	\$4.75	\$5.00

## Old Material

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$9.75	\$10.00	\$10.25	\$11.50
Heavy melting steel, Phila....	6.50	7.25	7.25	10.25
Heavy melting steel, Ch'go....	6.62 1/2	6.87 1/2	7.12 1/2	9.25
Carwheels, Chicago.....	6.50	7.00	7.00	9.50
Carwheels, Philadelphia.....	8.50	9.50	9.50	12.50
No. 1 cast, Pittsburgh.....	9.25	9.50	9.50	11.75
No. 1 cast, Philadelphia.....	8.50	9.00	9.50	11.50
No. 1 cast, Ch'go (net ton)...	6.50	7.00	7.00	9.00
No. 1 RR. wrot., Phila.....	8.50	8.50	8.50	11.00
No. 1 RR. wrot., Ch'go (net)...	4.25	5.25	5.50	7.50

## Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$2.25	\$2.25	\$2.25	\$2.50
Foundry coke, prompt.....	3.50	3.50	3.50	3.50

## Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Lake copper, New York.....	5.87 1/2	6.00	6.12 1/2	9.87 1/2
Electrolytic copper, refinery..	5.50	5.50	5.75	8.75
Tin (Straits), New York.....	20.40	19.65	19.60	23.25
Zinc, East St. Louis.....	2.55	2.60	2.80	3.25
Zinc, New York.....	2.92	2.97	3.17	3.60
Lead, St. Louis.....	2.90	2.90	2.90	3.80
Lead, New York.....	3.00	3.00	3.00	4.00
Antimony (Asiatic), N. Y....	5.35	5.35	6.05	6.70

# ▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

## Finished Steel

May 3, 1932  
One week ago  
One month ago  
One year ago

2.087c. a Lb.  
2.087c.  
2.087c.  
2.114c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.

	HIGH	LOW
1932 .....	2.087c., Mar. 29;	2.087c., Jan. 19
1931 .....	2.142c., Jan. 13;	2.052c., Dec. 29
1930 .....	2.362c., Jan. 7;	2.121c., Dec. 9
1929 .....	2.412c., April 2;	2.362c., Oct. 29
1928 .....	2.391c., Dec. 11;	2.314c., Jan. 3
1927 .....	2.453c., Jan. 4;	2.293c., Oct. 25
1926 .....	2.453c., Jan. 5;	2.403c., May 18
1925 .....	2.560c., Jan. 6;	2.396c., Aug. 18

## Pig Iron

\$14.22 a Gross Ton  
14.35  
14.35  
15.79

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
5; \$14.22, May 3		
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	
21.54, Jan. 5;	19.46, July 13	
22.50, Jan. 13;	18.96, July 7	

## Steel Scrap

\$7.62 a Gross Ton  
8.04  
8.21  
10.33

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
\$8.50, Jan. 12;	\$7.62, May 3	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	
17.25, Jan. 5;	14.00, June 1	
20.83, Jan. 13;	15.08, May 5	

# Pittsburgh Steel Industry Lapses Into More Pronounced Dullness

**P**ITTSBURGH, May 3.—The steel industry locally has again lapsed into extreme dullness following a fortnight of scattered activity and improved prospects. Although inquiry for structural steel and reinforcing bars is still heavy and further releases from the automobile industry are expected in the next two weeks, the current situation is so dull that even sentiment is less encouraging.

A comparatively strong price structure is the outstanding favorable factor, although promise of wage cuts by the major companies will give quotations further crucial tests in the next month or two. In the meantime, plans for further price advances to be effective in the third quarter are held in abeyance, and it is believed that the holding of present levels will be sufficient to satisfy steel producers for the time being.

Steel ingot production in the Pittsburgh district has again declined to 20 per cent, reflecting curtailment on the part of the larger interests. Output in the Valleys is still above 25 per cent, but shows no increase over last week. The steel producing rate in the Wheeling district is estimated at 45 per cent, with one large plant averaging even higher.

Operating schedules of finishing mills have not changed much in the aggregate, although sheet and strip output is holding recent gains. Tin plate production has again fallen under 50 per cent. Specifications of the leading container manufacturers are still limited and are hardly sufficient to maintain present schedules.

The raw materials markets are extremely dull, and scrap prices are nominally lower.

## Pig Iron

The market reflects no change, and there is no indication of an increase in shipments during May. The National Radiator Co. is reported to have closed against its recent inquiry for New Castle, Pa. Other purchases have been inconsequential. No merchant stacks are operating in this district or in the Valleys. The Neville Island furnace was banked in April. Prices are nominally unchanged.

## Semi-Finished Steel

Shipments are a little heavier, reflecting the slightly increased rate of operations by non-integrated sheet

Current situation in Pittsburgh steel market extremely dull.

\* \* \*

Steel wage cuts expected to give steel price structure a real test.

\* \* \*

Ingot production declines to 20 per cent at Pittsburgh, but is maintained at Wheeling and in the Valleys.

\* \* \*

Scrap prices have declined, duplicating previous low record levels.

▼ ▼ ▼

and strip makers. Prices on billets, slabs and sheet bars are nominal, ranging from \$26 to \$27 a ton. Forging billets are holding at \$33 a ton, and wire rods at \$37. Skelp is stronger at 1.60c. a lb., Pittsburgh, reflecting the improved price structure on plates.

## Rails and Track Supplies

New business is slow in being placed, and releases against old contracts are not as heavy as they were a month ago. Mill operations in the district are very light.

## Bars, Plates and Shapes

Demand for structural steel and reinforcing bars is well maintained, but has failed to show the expected spring improvement. At the same time inquiry is still accumulating rather rapidly and gives promise of heavier orders this month. Price levels on fabricated structural steel work are being advanced, and the inability of buyers to shade quotations is responsible for some work being held up. Barge inquiry is still encouraging, but lettings continue to be postponed. The barge yards in the district have scarcely any work in progress, and fabricated plate work is generally light. Merchant bars seem to be a little more active, and alloy material is in somewhat better demand from the automobile industry.

## Cold-Finished Steel Bars

Some producers report moderate increases in specifications, but the industry as a whole has reflected little improvement in the last month. The price is well maintained at 2c., Pittsburgh, and an advance for third quar-

ter is in line if the market on hot-rolled bars maintains its recent strength.

## Bolts, Nuts and Rivets

Although demand is showing little improvement, bolt and nut makers are encouraged by the comparative stability of prices. Little additional tonnage is coming from the automobile industry, and railroad buying is particularly light. Operations continue at about 20 per cent of capacity.

## Tubular Goods

The pipe market is without feature, and substantial line pipe tonnage is lacking. No further report has appeared regarding the tonnage for the Irak Petroleum Corp., in which American mills are expected to share. A number of small line pipe projects are coming out, but large lines are lacking. Standard pipe continues very quiet, but oil country goods show occasional activity. Mechanical tubing is very quiet.

## Wire Products

Although little change occurred in April, wire makers are still expecting a late seasonal improvement in demand from the merchant trade. A secondary buying movement usually develops about this time of the year, and is expected to be heavier than usual because of the failure of improvement to manifest itself heretofore. Manufacturers' wire also continues rather quiet, although demand from the automobile industry is slightly heavier. Prices are well maintained at 2.20c., Pittsburgh, on manufacturers' wire and \$1.95 a keg on nails.

## Sheets

Production is holding recent gains, and improvement is reported by companies which have shared the recent orders placed by the Ford Motor Co. The requirements of one or two other automobile makers are also heavier this month, and the month promises to show an improvement over April. Demand from other sources has not changed materially. Electric refrigerator sheets are still moving in fair volume, although the peak of the season has passed. Sheets for car repair purposes are particularly dull, and scarcely any demand is coming from farm implement makers served by Pittsburgh mills. Prices are still well maintained, and recent orders have

served to establish quotations rather clearly. Some producers are expecting a further advance for third quarter.

#### Tin Plate

Although last week made a good showing from a production standpoint, specifications fell off with a number of producers, and operations this week have dropped under the 50 per cent level which has prevailed recently. The container manufacturers are postponing commitments until crop reports are available, and releases from the two largest interests have only been about two-thirds of normal for the year to date.

#### Strip Steel

Improved releases from the automobile industry are giving the market a better tone, but aggregate demand shows little improvement. However, mill schedules this week are higher at about 25 per cent of capacity on hot-rolled strip, and 15 to 20 per cent on cold-rolled. Prices are well maintained on both hot and cold-rolled material.

#### Coke and Coal

The market is very quiet, and shipments of foundry coke are disappointing. The furnace grade is inactive, and heating coke is reflecting the usual seasonal curtailment. Prices on steam slack are still maintained at recently increased levels because of continued labor difficulties at eastern Ohio mines.

#### Scrap

The scrap market is nominally lower in the almost complete absence of buying by both consumers and dealers. No. 1 heavy melting steel may be quoted at \$9.50 to \$10, duplicating the lowest level on record, and most of the other grades are off from 25c. to \$1 a ton. Mill purchases during the next week might possibly bring higher prices, but dealers have no orders to speak of and are willing to sell in small lots at almost any figure. A little distress scrap is still being offered at prices well under the quoted levels, but such offerings can hardly be said to constitute the market. Hydraulic compressed sheets are weak, but not quotably lower. The Baltimore & Ohio Railroad list, closing May 2, contained 5300 tons of scrap. No reports of the price paid have come out in this district.

At the recent annual meeting of the Electrochemical Society in Baltimore, April 21 to 23, the following new officers were elected: President, R. A. Witherspoon, Shawinigan Chemicals, Ltd., Montreal, Que.; three vice-presidents, Duncan MacRae, E. M. Baker and Sterling Temple; managers, Acheson Smith, O. P. Watts and W. S. Landis; treasurer, R. M. Burns; secretary, Colin G. Fink.

1040—The Iron Age, May 5, 1932

## L. C. L. Freight Rates Reduced by Railroads 15 to 20 Per Cent May 1

**R**EDUCTIONS of 15 to 20 per cent in freight rates on steel products in less than car lots were placed in effect May 1. The evident purpose of this reduction is to meet the competition of motor trucks, and it is expected that the lower rates will result in the diversion of much of the less than car lot steel traffic where the shipments exceed 5000 lb. back to the railroads.

Although iron and steel products are in the fourth class in the railroad rate structure, the new less car lot rates are based on first class rates. In the Central Freight Association and Trunk Line territories east of the Mississippi the new rate is 40 per cent of the first class rate and in the Western Trunk Line territory the new less than car lot rate is 45 per cent of the first class rate.

Under the new schedule the rate between Cleveland and Pittsburgh is reduced from 34c. to 28c. per 100 lb., the rate in both cases including the 2c. surcharge. It is stated that the range in reduction in less than car lot rates is from 4c. to 12c. per 100 lb.

While the less than car lot rates are reduced in other Official Classification territories, they are advanced considerably for shipment to New England, where less than car lot rates have been in effect on certain commodities and these rates were lower than rates for the same points of delivery based on the new method of computation.

## Malleable Castings Output Off in March

WASHINGTON, May 2.—Declining 1931 net tons, the output of malleable castings totaled 19,597 tons in March against 21,578 tons in February, according to reports received by the Bureau of the Census from 118 establishments. Orders were 18,046, a drop of 1663 tons.

## Credit Curtailment Cause of Scrap Liquidation

The hesitation on the part of banks in New England to extend credit to business men and the calling in of well-secured loans has contributed to the demoralization of the price structure in the scrap iron industry to the lowest point in the history of the business, it was charged by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, at a meeting of the Boston chapter on April 28 in Boston.

The effect of this banking policy

has been to turn a tremendous tonnage of scrap into "distress" tonnage, with scrap dealers faced with the necessity of turning their stock into cash to meet loans and operating expenses.

## Story of Steel Merger Declared a "Fabrication"

WASHINGTON, May 3.—Denying a report published last Thursday in the *Washington Post* that a proposed merger of five steel companies had been brought to the attention of the Department of Justice, John Lord O'Brian, assistant attorney general in charge of anti-trust cases, issued the following statement:

"The statement in an article appearing in a morning paper that Department of Justice officials have acknowledged that a proposed combination of five large steel companies has been brought to the attention of the department is a pure fabrication. No such proposal has been brought to our attention."

The article was published under the name of Lawrence Sullivan. Its publication was followed by denials from the steel companies of a plan for consolidating. The companies named are the Republic Steel Corp., the Youngstown Sheet & Tube Co., the Jones & Laughlin Steel Corp., the Inland Steel Co. and the American Rolling Mill Co.

## General Electric Forms Air Conditioning Branch

The organization of an air conditioning department within the General Electric Co., which will market various electrical devices for home heating, humidifying and temperature control, has been announced by President Gerard Swope. One of the first products to be marketed by this new department will be a complete oil burning furnace.

J. J. Donovan of Cleveland, formerly in charge of apartment house refrigeration sales, will be manager. Associated with him will be E. D. Harrington, Schenectady, in charge of application engineering; J. R. Rue, Pittsfield, in charge of manufacturing, and H. S. Woodruff, Schenectady, in charge of design engineering. Headquarters will be maintained at General Electric's New York offices, 120 Broadway.



# Chicago Experiences Gain in Steel Sales; Bar Tonnage Substantially Better

**C**HICAGO, May 3.—New sales of finished steel are near the peak so far this year and specifications show improvement. However, much of this business has come to mills so recently that it has failed to check a slight downward movement in ingot production, which again stands near 20 per cent of capacity. There is the promise, however, that more open-hearths will be added in the near future.

Some small business in rails and a fresh inquiry for 10,000 tons is improving the outlook, and rail mills are now scheduled for about 30 days at their present rate of output. The bar tonnage, strongly influenced by manufacturers of the low-priced automobiles, is showing a satisfactory gain. Most miscellaneous users show little change in consumption, though the number of small orders being received indicates that more shops are busier. Output of hot and cold strips has gained moderately, and there is a better tone to the pig iron market.

On the other hand, consumers of scrap remain quiet and dealers are offering most grades at lower quotations, but find few takers. Prices for scrap are nominal.

Outlying districts are beginning to show some signs of a moderate business revival. Farmers are said to be adjusting their costs to the grain market, and some cities, such as St. Paul and Minneapolis, show distinct improvement in general activity.

## Pig Iron

This market is more active, as evidenced by several sizable inquiries and a 1500-ton order for malleable placed by an Indiana melter. A user has placed 500 tons of low phosphorus iron. Northern iron is steady at \$16 a ton, local furnace, but charcoal iron is again showing variation. Silvery prices are weak at Chicago and points reached by water shipments.

## Plates

The most encouraging recent news in this market is the tonnage that will be needed for the Hoover Dam, bids on which will be taken June 15. The local plate market is hard hit, the movement of this commodity being far below that of bars or shapes. The railroad equipment market is dull except for an inquiry for 10 tank cars. Railroad shops show no further gain in employment and their use of steel is light. The Pullman Car & Mfg.

Gain in steel business shown in both new sales and specifications. Improvement largely in bars.

\* \* \*

Ingot output has not gained, but more open-hearths may be put on soon.

\* \* \*

Pig iron also more active, but scrap is dull and prices generally are lower.

\* \* \*

Great Northern inquiring for 10,000 tons of rails.

▼ ▼ ▼

Corpn. is in the market for a small tonnage.

## Hot-Rolled Strip

Specifications issued by automobile manufacturers are slightly larger and output has gained a point or two. Miscellaneous use remains light.

## Cold-Rolled Strip

Production of this commodity has gained several points to an average for the industry of about 20 per cent of capacity. Prices are steady.

## Structural Material

Several small private lettings have come into the market, though public projects continue to predominate. Bridge and public building work tends to scatter awards over a wide territory. In the absence of heavy building construction, shops in the larger centers are not so well engaged as those in the outlying districts. Competition is keen, with the larger shops reaching far afield for jobs of less than 100 tons each.

## Cast Iron Pipe

Small orders are more numerous, but the market lacks the backing that it needs from inquiries and awards of medium and large tonnages. Railroads are out of the market and public utilities are buying in small lots at irregular intervals. Prices are variable.

## Rails and Track Supplies

The Illinois Central has ordered 4000 tons of rails from Chicago mills, and the Great Northern is in the market for 10,000 tons of rails and a small tonnage of splice bars. The

New York Central is taking prices on track supplies, but its rail tonnage, like that of Alton, has not been announced. Track accessories are being ordered in small lots and for immediate shipment. Rail mills are scheduled at the present rate for about 30 days, which in itself is an improvement.

## Wire Products

A slight gain in shipments is in evidence and the trade generally is more optimistic, although the upturn is late and small in the aggregate. It is, however, giving producers an opportunity to cut into stocks.

## Sheets

Production is better stabilized. The tonnage moving does not exceed 20 per cent of hot mill capacity. Producers claim to be carrying in stock only black sheets in sizes suitable for galvanizing.

## Bars

There is a substantial increase in new sales and specifications for bar mill products. The bulk of this new business is coming from low-priced automobile builders. Farm implement manufacturers, now idle, believe a larger volume of machinery will move to South America in the early fall months. Users of rail steel bars are pressing for early deliveries. These mills are producing at 25 per cent.

## Bolts, Nuts and Rivets

Orders continue to drop except from jobbers, who are slowly filling in stock. Most stove bolt users are covered by contract, so recent price changes lack tests.

## Reinforcing Bars

The sluggishness of orders and specifications for highway steel is disconcerting to local dealers. In view of the tonnage outstanding, the movement is extremely slow. Bids were opened April 28 at Springfield, Ill., on a number of short paving jobs that in the aggregate will take up to 800 tons.

## Scrap

Prices throughout most of the list are nominal. Dealers are offering heavy melting steel at \$6.75 and find no takers. Railroad offerings are unchanged except in the case of the Illinois Central, which has a list of 4000 tons, the first to be issued in several months. Scrap shipments to steel mills have been cut at least 15 per cent.

# Eastern Pennsylvania Pig Iron Weakens on Foreign Competition

Some Buyers of Imported Iron Are Offering It for Resale—Scrap Prices Decline to New Lows

**P**HILADELPHIA, May 3.—Reports of business for April are mixed. Some mills saw only a slight increase over March, while one interest making diversified lines had an increase of more than 20 per cent. The increase in prices for heavy and flat rolled products apparently was somewhat effective in bringing out specifications. The market is still upset, but irregular conditions are no longer a matter of particular comment.

No predictions are made as to what may develop in the present month. The trade has settled down to an attitude of quiet hopefulness and it feels that any change is likely to be one of improvement.

There is growing interest in the application of the Pennsylvania Railroad for a loan of \$55,000,000 from the Reconstruction corporation. The trade is puzzled at the delay of the Interstate Commerce Commission in acting upon the application.

Pig iron prices have softened and further declines have developed in the scrap market. The rate of steel operations is unchanged from last week.

## Pig Iron

Pressure from low-priced imports has softened levels for domestic foundry iron. Shipments are few and are confined to car lots, but offerings have brought the price down to \$14 to

\$14.50, base furnace. It is reported that this is due partly to effort to resell imported iron. Incoming shipments are said to exceed requirements of melters who bought foreign iron, with the result that the excess is being offered in the open market.

## Plates, Shapes and Bars

One maker reports that, considering present conditions, orders for bars and shapes last week reflected a fair upturn. No improvement has developed in the plate market.

## Sheets

The market is extremely dull. There is almost an entire absence of new business. Even small-lot bookings have become scarcer.

## Imports

Imports at Philadelphia last week were: Steel bars from Belgium, 757 tons; steel bands from Belgium, 20 tons; steel bands from Germany, 20 tons; structural shapes from Belgium, 402 tons.

## Scrap

The market has weakened further. Heavy melting steel, based on actual sales, has declined to \$6 to \$7 and other grades have taken a corresponding downward course. Releases are few and involve only small lots.

## Pacific Coast Pending Projects Call for 90,000 Tons, Including Hoover Dam Work

**S**AN FRANCISCO, May 2.—Little change occurs from week to week. There is some tendency toward strengthening in both volume and price. However, recent demand is not considered sufficient to have tested the market.

Calls for bids have been issued or are pending on projects involving 27,000 tons of bars, shapes and plates, in addition to the 63,500 tons for Hoover dam. During the past week awards reported were under 1200 tons, with new inquiries for 2000 tons. The most important inquiry for wrought steel pipe in many weeks comes from Long Beach, where bids for 400 tons of gas service pipe are being opened on May 3.

Importers of reinforcing steel reached a new low in their competi-

tion when foreign bars were recently quoted at 1.12c. a lb., c.i.f. Pacific Coast ports, including machine straightening and without size differentials. The domestic mill schedule calls for 2c. for similar material.

## Canadian Business Aided by Automotive Activity

**T**ORONTO, May 2.—Increased activities in the automotive industry continue to be reflected in betterment in other branches of the iron and steel trade. Announcement is made that the National Steel Car Co., Hamilton, Ont., has received orders from the Ford Co. of Canada, Ltd., for steel chassis frames, which will enable it

to keep its plant in operation all summer.

Pig iron business is well sustained at a low rate. Sales total about 500 tons a week.

Steel scrap has very little call, mills being out of the market. No. 1 machinery cast is moving freely and there is irregular demand for wrought scrap and stove plate.

## New England Pig Iron Sales Gain Slightly

**B**OSTON, May 3.—Although the aggregate tonnage fell short of 1000 tons, pig iron sales the past week showed a slight increase, the first in months. Sales were largely of Mystic, Buffalo and Indian irons. Indian iron was sold at close to \$19 a ton, delivered, while offers of Dutch iron at \$16 a ton, delivered, found no takers. Domestic iron prices are holding well. There are no inquiries in the market.

## Scrap

The American Steel & Wire Co., Worcester, Mass., continues to purchase small tonnages of No. 1 heavy melting steel at around \$5.75 a ton, delivered, but apparently there is no other market for that or any other kind of scrap.

## Birmingham Pig Iron and Steel Trade Remains Dull

**B**IRMINGHAM, May 3.—The April movement of merchant pig iron was practically the same as for March. Orders continue to drift in from day to day with irregularity and uncertainty. The price of \$11 for Southern deliveries is holding firm. Republic Steel has changed its furnace from foundry to a special grade of high-silicon iron, which is being shipped north to other plants of the company. Seven blast furnaces are active, no change having taken place since the middle of April.

## Steel

Steel bookings are scattered and made up of miscellaneous business. One company reported a slight gain last week, due to some orders for track supplies. These were not large, it was stated. There is no particular activity in any line. Prices are unchanged. The Tennessee company is operating five open-hearth at Ensley and four at Fairfield. Gulf States Steel has put on two open-hearth.

## Scrap

Shipments are small, and there is only a very meager demand. Prices are unchanged.

# Cleveland Ingot Output Higher Though New Business Is Slack

**Spurt of Automobile Buying Appears to Be Over for the Present—  
Pig Iron Demand Broadening**

CLEVELAND, May 3.—Ingot production at Cleveland was increased three points to 29 per cent of capacity this week. The American Steel & Wire Co. added two furnaces and the Corrigan, McKinney Steel Co. put on one. Each is now operating five open-hearths. However, this increase was partly offset by the shutdown of two furnaces the Otis Steel Co. had been operating.

The steel market was very quiet during the past week. Following the spurt of business that was brought about by the placing of Ford orders, little business came from the motor car industry during the week. The Hudson Motor Car Co. has inquiries out for forgings, which are said to be for a new model in the low-priced automobile field, but, aside from that, little inquiry developed from motor car sources. Small orders for sheets from miscellaneous users show a slight gain. Shipments of hot-rolled strip to the motor car industry are holding up fairly well. Business with metal-working plants outside of the motor car field continues slack.

Demand for pig iron continues to broaden slightly and May shipments are expected to show a fair increase over those in April.

There is little of interest in the price situation, as the market has a firm tone and regular quotations are being well maintained on all products.

## Pig Iron

Shipping orders show a further improvement, and a moderate gain in the movement is expected this month over April. Releases have gained from the motor car industry, and there is a seasonal increase in orders from the makers of stoves, furnaces and radiators. Some improvement in the demand from the oil industry is also reported. A Muncie, Ind., consumer has bought 1500 tons of malleable iron against its recent inquiry. With that exception, orders were scarce the past week and little inquiry developed. Prices are unchanged at \$15.50, furnace, for local delivery and \$15 for nearby shipment. Lower prices are being named for delivery to outside competitive points.

## Iron Ore

Water shipments of Lake Superior ore in April amounted to 44,073 tons, all going to Lake Michigan ports. This is a decrease of 131,848 tons, compared with the same month last year. The first cargo for Lake Erie will reach port tomorrow. As consumers are not

in need of ore, no inquiry has come out and prices for the season have not been named.

## Bars, Plates and Shapes

Demand for these products continues very light. Reinforcing bars show a moderate seasonal improvement. A State highway bridge in Brook Park, Cleveland, to be advertised shortly, is expected to take 1000 tons. Keen competition by the makers has resulted in sharp concessions on rail steel bars, with reports of prices as low as 90c. per 100 lb., mill. Activity in the structural field shows no improvement. The only sizable award is 900 tons for the Cleveland Post Office foundations. Prices are steady at 1.65c., Cleveland, for steel bars and 1.60c., Pittsburgh, for plates and shapes.

## Sheets

Demand for small lots from miscellaneous sources became slightly more active the past week. Stamping plants in this territory are not get-

ting much new business from the motor car manufacturers. Orders from refrigerator makers are holding up well, although not as heavy as a few weeks ago. The market is generally firm. While hot-rolled annealed sheets are holding at 2.20c., Pittsburgh, for current orders, some consumers were able to cover through this quarter at the old 2.05c. price.

## Strip Steel

Good releases from the automobile parts makers in Detroit mostly for hot-rolled material were received by one Valley district mill during the week. Indiana makers of automotive parts continue to take fair-sized lots. New demand in this territory is very light. Prices appear to be firm.

## Coke

A 50c. a ton price reduction on Ohio by-product foundry coke to \$6.75, furnace, was made May 1. The Cleveland delivered price is now \$7.82. Premium grades of Connellsville foundry coke have been reduced 25c. a ton to \$4.25 oven. Demand continues slow.

## Scrap

A Cleveland mill and one in Youngstown are taking restricted shipments, but other consumers in this city in the Valley district are accepting no scrap. There is no new demand either from consumers or dealers. The market is weak, with prices untested.

It is also reported that the same consumer purchased a boat tonnage at Detroit at \$5.75 to \$6, delivered Buffalo. This has weakened the borings and turnings market here. With the closing of one important plant consuming stove plate and the 30-day suspension of another, the demand for this material has fallen off still further.

## Buffalo Steel Plants at 30 Per Cent Rate

BUFFALO, May 3.—An inquiry for 1000 to 1500 tons of foundry iron has been put out by a New Jersey melter. Another inquiry from the East is for 100 tons of foundry iron. Operations are unchanged.

## Steel

The Republic Steel Corp., after a short lay-off, resumed operations with three open-hearths Saturday night. These are expected to run through until next Saturday. The Lackawanna plant of Bethlehem Steel is operating nine open-hearths. This is about a 30 per cent rate for the district. Seneca Iron & Steel Co. is running at about 25 per cent. The reinforcing bar situation looks decidedly better, even though the State road building program has been curtailed. Several fair-sized jobs are being figured with lettings due in a couple of weeks.

## Scrap

Shipments are beginning to come through on a 5000-ton order of borings and turnings placed about three months ago in New England by a Buffalo consumer. The delivered price by barge is reported to be \$6 a ton.

## Cincinnati Pig Iron Demand Still Dull

CINCINNATI, May 3.—Scattered bookings of pig iron in this district totaled less than 700 tons the past week. Consumers are not anticipating their requirements. A few automotive foundries in this district are operating at a fair rate, but the melt generally is low. Concessions on Northern iron outside of Cincinnati are reported.

## Detroit Scrap Prices Weak, Business Dull

DETROIT, May 3.—Activity in scrap has been limited to minor transactions. Prices are showing a tendency toward further weakness, but are unchanged.



# New York Office Building Takes 5,500 Tons of Steel

Business Otherwise in Metropolitan District at Extremely Low Level—April Sales Below Those of March

NEW YORK, May 3.—An award of 5500 tons of fabricated structural steel to the McClin-tic-Marshall Corp. for the Insurance Co. of North America Building in New York is the outstanding item of a week's business that has virtually had no parallel for dullness. Almost without exception, steel companies booked less business in the New York district during April than in any month of the depression period, while for some companies the month's total was the poorest in many years. One company's total tonnage in April was 40 per cent under that booked in March, and had it not been for a fair volume of tin plate business its April orders here would have made a much worse showing.

With such a small volume of business as is now being quoted on, current prices are not yet getting much test. A real test must come soon if the mills carried out to the letter their intention of permitting no shipments against first quarter contracts later than April 30. It appears, however, that some first quarter arrangements were not quite this rigid, particularly on plates. Moreover, there are some outstanding protections on specific

plate jobs at prices below those currently quoted on small lots. Sheet prices are said to be very firm. A large user of galvanized sheets with a nation-wide business was unable to uncover any sign of weakness anywhere in that grade.

## Pig Iron

The market continues to be listless. A preponderance of car lot orders contracted the volume of new business last week, when total bookings barely aggregated 1500 tons, compared with 2500 tons the week before and 1500 tons two weeks ago. Weakness in the price of eastern Pennsylvania iron is evidenced by offerings at \$14 to \$14.25, furnace, for No. 2 plain, a reduction of 50c. to 75c. a ton from the previous schedule for that iron.

## Scrap

With practically no market for scrap, prices are generally weak. No. 2 heavy melting steel has been purchased at \$2.25 to \$2.50, and stove plate is available at \$4. Although No. 1 heavy melting steel is understood to be obtainable at \$5 a ton on barge, the bulk of buying of this grade is still at \$5.50.

scrap on his books. Prices are nominal. Railroad malleable is 25c. a ton lower. Railroad lists: Baltimore & Ohio, 5300 tons; Pennsylvania, 11,100, none of which is likely to be purchased by dealers in this district.

## St. Louis Business Has Shown No Improvement

ST. LOUIS, May 3.—A continuation of small orders, mostly carload lots, characterizes the local pig iron market. Jobbing foundries are operating only one or two days a week, with the exception of one plant, which has been on a five-day basis; four of the largest stove factories on the East Side have not taken off a heat this year, and those on the West Side are operating only one or two days a week. One open-hearth furnace is in operation. Pig iron prices are unchanged.

Plant revamping work is being carried on to some extent in the Oklahoma oil fields, and a number of inquiries for 25 and 50 ton plate jobs have been issued. A slight increase also is reported in the number of small jobs requiring structural shapes.

## Scrap

It is believed that no dealer in the district has an order for a carload of

## Reinforcing Steel

Awards 2235 Tons—New Projects 4000 Tons

### AWARDS

Boston, 300 tons, boys' latin school, to Republic Fireproofing Co., Inc.  
Frankfort, Ky., 350 tons, State bridge at Carrollton, to Jones & Laughlin Steel Corp.  
Birmingham, 250 tons, service building, Louisville & Nashville Railroad station, to Truscon Steel Co.  
Davenport, Iowa, 100 tons, post office, to Truscon Steel Co.; previously reported to an unnamed bidder.  
Roseburg, Ore., 600 tons, Veterans' administration buildings, to Pacific Coast Steel Co.  
San Diego County, Cal., 230 tons, Chocolate Creek highway section, to Fenton Material Co.  
Monterey County, Cal., 138 tons, Rocky Creek State highway bridge, to Soule Steel Co.  
Solano County, Cal., 205 tons, State highway structures, to Truscon Steel Co.

## REINFORCING BARS

Mitchel Field, N. Y., 160 tons, barracks, to Concrete Steel Co.

## NEW REINFORCING BAR PROJECTS

Hackensack, N. J., 413 tons, Sears, Roebuck & Co. building.  
Hershey, Pa., 600 tons, warehouse for Hershey Chocolate Co.; bids to be opened this week. This was changed from structural design to reinforced concrete.  
Cleveland, 150 tons, sewer.  
Cincinnati, 250 tons, yard service building and retaining wall for Cincinnati Union Terminals Co.  
Plymouth, Wis., 150 tons, school.  
Joliet, Ill., 100 tons, canal retaining walls.  
State of Illinois, 800 tons, highway projects.  
Chicago, tonnage being estimated, Marine Hospital.  
Moline, Ill., 300 tons, water treatment plant.  
Los Angeles, 190 tons, city power substation in West Hollywood.  
Los Angeles County, 400 tons, County bridges on Firestone Boulevard; bids closed May 2.  
San Francisco, 160 tons, Jewish community center building, bids closed April 29.  
Redding, Cal., 100 tons, County hospital addition.  
State of Montana, 100 tons, County highway structures; bids close May 10.  
Honolulu, 300 tons, warehouse for Honolulu Construction & Drayage Co., E. E. Black, Ltd., general contractor.

## Pipe Lines

Northern Natural Gas System, City National Bank Building, Omaha, Neb., plans pipe line to Forest City, Iowa, and vicinity, with capacity of 500,000 cu. ft. daily.

Missouri Power & Light Co., Board of Trade Building, Kansas City, Mo., is planning steel pipe line from gas fields, near Liberty, Mo., to Excelsior Springs, Mo., about 15 miles. Cost about \$100,000 with distributing system at place last noted, compressor plant and other equipment. Franchise has been granted.

Pennsylvania Power & Light Co., Allentown, Pa., will install natural gas pipe lines for service at Sunbury, Northumberland, Bloomsburg, Danville, Pa., and vicinity.

Independent Pipe Line Co., subsidiary of Phillips Petroleum Co., Bartlesville, Okla., has abandoned project for installation of welded steel pipe line from South Oklahoma City to Earlsboro, Okla. Company has acquired an 8-in. pipe line from Prairie Pipe Line Co., between places noted, and will operate for crude oil supply.

Union Oil Co., Los Angeles, has awarded 366 tons of 4- to 12-in. pipe for a line for the refinery at Wilmington, Cal., to Macco-Robertson, Ltd., Clearwater, Cal.

## Cast Iron Pipe

Wellesley, Mass., has awarded 450 tons of 6-, 10-, 12- and 14-in. to Warren Foundry & Pipe Corp.  
Brentwood, N. Y., has opened bids on 285 tons of 3 to 30-in.  
Wingdale, N. Y., has opened bids on 486 tons of 3 to 24-in.  
Somers, N. Y., has awarded 600 tons of 6 to 12-in. to R. D. Wood & Co.  
Lititz, Pa., is inquiring for 110 tons of 3 to 12-in.  
Neenah, Wis., will close bids May 9 on 115 tons of 6 and 10-in. class C water pipe.  
Madison, Wis., will close bids May 10 on 1820 lin. ft. of 14-in. sewer pipe.  
San Clemente, Cal., is planning a water system which will require about 350 tons of 4-, 6- and 12-in.  
Tacoma, Wash., will call for bids for 80 to 90 tons of 12-in. class C.

## Railroad Equipment

Great Northern plans to build three locomotives in its Hillyard shops at Spokane, Wash.  
Sherwin-Williams Co. has taken bids on 10 8000-gal. tank cars.

# Fabricated Structural Steel

## Awards in Larger Volume—Pending Projects Decline

**B**OOKINGS of 14,150 tons were the largest since the first week of April, when 17,100 tons was awarded. A building for the Insurance Co. of North America in New York will require 5500 tons. Flood control work at San Pedro, Cal., accounts for 2650 tons. New projects call for only 5025 tons. The largest inquiry is 1200 tons for bridges in West Virginia. Contracts in April amounted to 43,600 tons, compared with 66,100 tons in March and 40,550 tons in February. Awards follow:

### NORTH ATLANTIC STATES

Presque Isle, Me., 239 tons, State bridge, to Pittsburgh-Des Moines Steel Co.  
New York, 5500 tons, Insurance Co. of North America building, to McClintic-Marshall Corpn.  
New York, 750 tons, Fred F. French Co. multiple dwelling unit No. 1, to Lehigh Structural Steel Co.  
Philadelphia, 350 tons, warehouse and sales room for National Casket Co., to Belmont Iron Works.

### SOUTH AND SOUTHWEST

Preston County, W. Va., 450 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.  
Birmingham, 145 tons, bridge near Birmingham for Warrior River Terminal Co., to Virginia Bridge & Iron Co.  
Pawnee, Okla., 400 tons, bridge, to J. B. Klein Iron & Foundry Co.

### CENTRAL STATES

Cleveland, 900 tons, foundation for Cleveland post office for Cleveland Union Terminal Co., to American Bridge Co.  
State of North Dakota, 200 tons, highway bridges, to McClintic-Marshall Corpn.  
Rockford, Ill., 690 tons, post office, to American Bridge Co.; previously reported to an unnamed bidder.  
La Salle, Ill., 100 tons, Marquette Cement Mfg. Co., to Continental Bridge Co.

State of Minnesota, 955 tons, bridges: 800 tons to American Bridge Co.; 155 tons to Minneapolis-Moline Power Implement Co.  
Superior, Wis., 110 tons, Teachers' College, to American Bridge Co.  
St. Louis, 160 tons, sanitary district, to Stupp Brothers Bridge & Iron Co.  
Kansas City, Mo., 150 tons, grain elevator, to Mississippi Valley Structural Steel Co.  
Kansas City, Kan., 300 tons, Kansas City terminal, to Kansas City Structural Steel Co.

### WESTERN STATES

San Pedro, Cal., 2750 tons, flood control work: 1300 tons to American Bridge Co., and 1450 tons to Consolidated Steel Corpn.  
Southern Pacific Railroad, 245 tons, bridge, to Virginia Bridge & Iron Co.  
Pomona, Cal., 175 tons, grandstand for County fair grounds, to McClintic-Marshall Corpn.  
Sheridan, Ore., 250 tons, novitiate, to Poole & McGonigle.

### NEW STRUCTURAL STEEL PROJECTS

#### NORTH ATLANTIC STATES

Norwich, Conn., 100 tons, State bridge.  
Jamestown, N. Y., 350 tons, State armory.  
Downington, Pa., 200 tons, high school; Progressive Iron Works, Reading, Pa., low bidder.

#### SOUTH AND SOUTHWEST

State of West Virginia, 1200 tons, highway bridges.

Richmond, Va., 350 tons, warehouse and transit shed.

Knoxville, Tenn., 850 tons, post office; Kutsche & Co., Detroit, low bidders on general contract.

State of Oklahoma, 285 tons, highway bridges: Latimer County, 170 tons; Kiowa County, 115 tons; bids to be opened May 10.

### CENTRAL STATES

Chippewa Falls, Wis., 1000 tons, State highway bridge; Worden-Allen Co., low bidder.  
Chicago, 350 tons, addition to hockey rink.  
State of Illinois, 265 tons, highway bridges at Hopedale and Bluffs.

### WESTERN STATES

Sacramento County, Cal., 725 tons, bridge on Fair Oaks Boulevard.  
Snohomish County, Wash., 650 tons, Skykomish River State highway bridge, Pacific States Construction Co. low bidder.  
Skagit County, Wash., 550 tons, power house and transmission towers for Seattle municipal power development; bids close May 18.  
Los Angeles County, Cal., 327 tons, County bridges on Firestone Boulevard; bids closed May 2.  
Monterey, Cal., 100 tons, telephone exchange building.  
State of Montana, 213 tons, highway bridges; bids close May 10.

### FABRICATED PLATE

#### AWARDS

Lewisburg, Pa., 200 tons, standpipe and tank, to Chicago Bridge & Iron Works; Suburban Engineering Co., general contractor.  
State of Kentucky, 100 tons, two 75,000-gal. tanks for American Tobacco Co., to Pittsburgh-Des Moines Steel Co.  
Oakland, Cal., 100 tons, tanks for municipal water district, to Berkeley Steel Construction Co.  
Los Angeles, 100 tons, tank for municipal water system, to Lacy Mfg. Co.

#### NEW PROJECTS

Cleveland, 200 tons, tanks, McClintic-Marshall Corpn., low bidder.

## Coming Meetings

### May

American Gear Manufacturers' Association, May 12 and 13. Sixteenth annual meeting, Hotel Statler, Cleveland. T. W. Owen, Ninth-Frescent Building, Cleveland, secretary.

National Industrial Advertisers' Association, May 16 to 18. Annual meeting, Hotel Statler, Cleveland. R. Davison, 160 Front Street, New York, secretary.

American Steel Warehouse Association, May 17 and 18. Annual meeting, Hotel Commodore, New York. Benjamin R. Sackett, 503 Arch Street, Philadelphia, secretary.

Chamber of Commerce of the United States, May 17 to 20. Annual meeting, San Francisco. D. A. Skinner, 1617 H Street, N. W., Washington, secretary.

Steel Founders' Society of America, May 18. Spring meeting, Roosevelt Hotel, New York. Granville P. Rogers, Graybar Building, New York, managing director.

American Iron and Steel Institute, May 19. Spring meeting, Hotel Commodore, New York. Howard H. Cook, Empire State Building, New York, secretary.

American Institute of Steel Construction, May 24 and 25. Symposium on trend in building construction, Engineering Societies Building, New York. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

American Institute of Mining and Metallurgical Engineers, May 24 and 25. Open-Hearth Committee meeting, William Penn Hotel,

Pittsburgh. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, chairman of committee.

Porcelain Enamel Institute, May 26. Second annual meeting, Hotel Cleveland, Cleveland. W. E. Hogenon, Chicago Vitreous Enamel Products Co., Chicago, secretary.

American Refractories Institute, May 18. Annual spring meeting, William Penn Hotel, Pittsburgh. Dorothy A. Texter, Oliver Building, Pittsburgh, secretary.

## Office Changes

Concrete Reinforcing Steel Institute has moved its offices from the Tribune Tower Building to 333 North Michigan Boulevard, Chicago.

Jay G. Stephens Corpn., Pittsburgh, dealer in iron and steel scrap, has removed its offices to Dravosburg, Pa., effective April 29. The freight shipping address is Moss Side, Pa.

United Iron & Metal Co., Pittsburgh, dealer in iron and steel scrap and old materials, has removed its offices from the Grant Building, Pittsburgh, to its yard at Ninth and Bingham Streets, South Side, Pittsburgh.

Henry B. Newhall Corpn. and its divisions, the Diamond Expansion Bolt Co., the Newhall Chain Forge & Iron Co., and the New Jersey Foundry & Machine Co., have moved their office and warehouse to the ground floor of 48 West Broadway, New York.

Republic Steel Corpn. has removed its Pittsburgh district sales offices, under the management of Frank M. Welsh, from the Oliver Building, to its plant at Fourth and Bingham Streets, South Side, Pittsburgh. The plant was formerly operated by Dilworth, Porter & Co., now a part of the Republic company. The change was effective April 16.

American Industrial Corpn., manufacturer of lamp locks, wrenches and chaplets, has moved its offices to the New York Central Building, New York.

Sullivan Machinery Co. has removed its branch office at Knoxville, Tenn., to the Medical Arts Building. E. L. Thomas is manager.

Erman-Howell & Co., Inc., dealer in iron, steel and alloy scrap, car materials and storage tanks, is moving its office from the McCormick Building to its car dismantling plant at 300 West 87th Street, Chicago.

Maryland Steel Products Co., Baltimore, has moved its general offices to 1001 North Calvert Street.

W. G. Ellis, representing the Ohio Electric Mfg. Co., makers of lifting and separation magnets and of fractional-size motors in Philadelphia, has moved his office to Broad Street Station Building.

United Engineering & Foundry Co., Pittsburgh, has removed its general offices to the First National Bank Building in that city. The offices have been in the Farmers Bank Building for several years.

Nashville Bridge Co. and the Bessemer Galvanizing Works have moved their sales offices from Birmingham to their plants at Bessemer, Ala.

# Copper Sluggish; Tin Advances Sharply; Lead Improving; Zinc at New Low

NEW YORK, May 3.—Interest in electrolytic copper, both here and abroad, is virtually at dead center. The lack of demand from foreign consumers is reflected in total bookings of only 105 tons thus far in May. Domestic users are displaying little interest in either prompt or future metal. Specifications from the automotive industry are spotty, with Ford Motor Co. taking the bulk of current releases. Demand from wire makers has practically disappeared. Despite the dearth of prospective business, however, prices are fairly steady, with both primary producers and custom smelters offering electrolytic copper at 5.75c., delivered. Export copper is being sold at 6c., c.i.f. usual foreign ports. Lake copper is nominal at 5.87½c., delivered.

## Copper Averages

The average price of lake copper for April, based on daily quotations in THE IRON AGE, is 6c. a lb., delivered New York. The average price of electrolytic copper is 5.54c., refinery, or 5.79c., delivered in the Connecticut Valley.

## The Week's Prices. Cents Per Pound for Early Delivery

	Apr. 27	Apr. 28	Apr. 29	Apr. 30	May 2	May 3
Lake copper, New York.....	5.87½	5.87½	5.87½	5.87½	5.87½	5.87½
Electrolytic copper, N. Y.*.....	5.50	5.50	5.50	5.50	5.50	5.50
Straits tin, spot, N. Y.....	19.37½	19.40	19.00	.....	20.00	20.40
Zinc, East St. Louis.....	2.60	2.55	2.55	2.55	2.55	2.55
Zinc, New York.....	2.97	2.92	2.92	2.92	2.92	2.92
Lead, St. Louis.....	2.90	2.90	2.90	2.90	2.90	2.90
Lead, New York.....	3.00	3.00	3.00	3.00	3.00	3.00

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.  
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.  
Antimony, 5.35c. a lb., New York.  
Brass ingots, 85-5-5-5, 6.12½c. a lb., New York and Philadelphia.

## From New York Warehouse

### Delivered Prices, Base per Lb.

Tin, Straits pig.....	22.00c. to 23.00c.
Tin, bar.....	24.00c. to 26.00c.
Copper, Lake.....	8.00c. to 9.00c.
Copper, electrolytic.....	7.75c. to 8.75c.
Copper, casting.....	7.50c. to 8.50c.
*Copper sheets, hot-rolled.....	15.37½c.
*High brass sheets.....	12.50c.
*Seamless brass tubes.....	15.75c.
*Seamless copper tubes.....	14.87½c.
*Brass rods.....	10.25c.
*Braze brass tubes.....	21.62½c.
Zinc slab.....	4.00c. to 4.50c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig.....	4.00c. to 4.50c.
Lead, bar.....	5.75c. to 6.75c.
Lead sheets.....	7.50c.
Antimony, Asiatic.....	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	17.00c. to 18.00c.
Solder, ½ and ½.....	14.75c. to 15.75c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

## Metals from Cleveland Warehouse

### Delivered Prices per Lb.

Tin, Straits pig.....	24.00c.
Tin, bar.....	26.00c.

## Lead

Consumer buying of lead for shipment through June continues in moderate volume. With an improved statistical position practically assured by the curtailed producing schedules becoming effective in the industry, consumers are inclined to cover more liberally against their forward requirements. Prices are well maintained and unchanged at 2.90c. a lb., St. Louis, and 3c., New York.

## Tin

Sharp advances yesterday and today in the London price of tin followed a report that the International Tin Committee had agreed to a suspension of operations for two months. Details of the reported agreement are still vague, however, particularly with respect as to whether the shutdown will supplement the 20,000-ton curtailment in output over a one-year period, previously agreed upon, or whether the new arrangement is intended to revise the previous agreement to be effected within a two-month period. The New York market has not yet

been influenced by this report, and activity here in the past week was extremely sluggish. The London market today was £120 12s. 6d. a ton for spot standard, £122 15s. for future standard and £124 12s. 6d. for spot Straits. Today's Singapore price was £123 12s. 6d. The world's visible supply of tin, plus the carryover in the Far East, as of April 30, was 60,347 tons. United Kingdom warehouse stocks were reduced 220 tons last week and stand at 33,221 tons.

## Zinc

A new low price level for zinc was reached last week, when offers were made at 2.55c. a lb., East St. Louis, and 2.92c., New York, for prompt shipment. Consumers are only passively interested, even at the abnormally low quotations, and buying is in light volume. Last week's sales totaled only 1600 tons, compared with 3700 tons in the preceding week.

## Bar Iron Wage Rate Unchanged

The wage rate on bar iron will remain unchanged for May and June as based on a 1.65c. card, according to an agreement reached between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The rate is based on the average selling price of bars in the March-April period.

American Institute of Steel Construction has forwarded to President Hoover and to members of the United States Senate and House of Representatives a copy of a resolution recently adopted by its executive committee, petitioning the executive and legislative branches of the Government for immediate relief from high taxation through a reduction in Government expenditures. The resolution suggests the elimination of unessential boards and departments, a reduction in unnecessary personnel in all departments and a downward readjustment of salaries and wages for those engaged in public service.

The Iron and Steel Institute (Great Britain) will hold its autumn meeting in London, Sept. 13, 14 and 15. The meeting will take place concurrently with that of the Institute of Metals. A joint meeting may take place at which papers by members of both institutes would be presented and discussed.

Copper, Lake.....	7.00c.
Copper, electrolytic.....	7.00c.
Copper, casting.....	6.75c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig.....	3.75c. to 4.00c.
Lead, bar.....	7.25c.
Antimony, Asiatic.....	10.00c.
Babbitt metal, medium grade.....	14.50c.
Babbitt metal, high grade.....	28.00c.
Solder, ½ and ½.....	16.00c.

## Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	4.25c.	5.00c.
Copper, hvy. and wire	4.00c.	4.75c.
Copper, light and bottoms.....	3.25c.	4.00c.
Brass, heavy.....	2.25c.	2.75c.
Brass, light.....	1.75c.	2.50c.
Hvy. machine composition.....	3.25c.	3.75c.
No. 1 yel. brass turnings.....	2.25c.	2.75c.
No. 1 red brass or compos. turnings..	2.75c.	3.25c.
Lead, heavy.....	2.00c.	2.50c.
Zinc.....	1.00c.	1.625c.
Cast aluminum.....	3.50c.	4.75c.
Sheet aluminum.....	8.50c.	10.00c.



# Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

## BARS, PLATES, SHAPES

### Iron and Steel Bars

#### Soft Steel

Base per Lb.	
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c.
Del'd Philadelphia.....	1.91c.
Del'd New York.....	1.95c.
Del'd Detroit.....	1.80c.
F.o.b. Cleveland.....	1.65c.
F.o.b. Lackawanna.....	1.70c.
F.o.b. Birmingham.....	1.75c.
C.I.F. Pacific ports.....	2.00c.

#### Ballot Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....	1.60c.
F.o.b. Birmingham, mill lengths.....	1.75c.
F.o.b. Cleveland.....	1.50c.

#### Rail Steel

F.o.b. mills, east of Chicago dist.....	1.30c. to 1.35c.
F.o.b. Chicago Heights mills.....	1.50c. to 1.60c.
Del'd Philadelphia.....	1.49c. to 1.59c.

#### Iron

Common iron, f.o.b. Chicago.....	1.70c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.11c.
Common iron, del'd New York.....	2.15c.

### Tank Plates

Base per Lb.	
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c.
F.o.b. Birmingham.....	1.75c.
Del'd Cleveland.....	1.8035c.
Del'd Philadelphia.....	1.7935c.
F.o.b. Coatesville.....	1.70c.
F.o.b. Sparrows Point.....	1.70c.
F.o.b. Lackawanna.....	1.70c.
Del'd New York.....	1.898c.
C.I.F. Pacific ports.....	1.85c.

### Structural Shapes

Base per Lb.	
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Birmingham.....	1.75c.
F.o.b. Lackawanna.....	1.70c.
Del'd Cleveland.....	1.8035c.
Del'd Philadelphia.....	1.6495c.
Del'd New York.....	1.86775c.
C.I.F. Pacific ports (standard).....	2.00c.
C.I.F. Pacific ports (wide flange).....	2.10c.

### Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh.....	1.90c.
F.o.b. Chicago mill.....	2.05c.
F.o.b. Buffalo.....	2.00c.

### Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.	Alloy Differential per 100 Lb.
8 & 16 Series Numbers	
3000 (1/4% Nickel)	\$0.25
4100 (1 1/4% Nickel)	0.55
2300 (3/4% Nickel)	1.50
5500 (5% Nickel)	2.35
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.30
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.60 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar..	1.20
6100 Chromium Vanadium Spring Steel	0.95
9500 Silicon Manganese Spring Steel (flat)	0.25
Rounds and squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/2 c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 18 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 18 in. or over carry the billet price. Slabs with sectional area of less than 18 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

### Cold-Finished Bars

Base per Lb.	
Bars, f.o.b. Pittsburgh mill.....	2.00c.
Bars, f.o.b. Chicago.....	2.00c.
Bars, Cleveland.....	1.90c. to 2.00c.
Bars, Buffalo.....	2.00c.
Shafting, ground, f.o.b. mill.....	2.35c. to 3.30c.

\*According to size.

## SHEETS, STRIP, TIN PLATE, TERNE PLATE

### Sheets

#### Hot-rolled

Base per Lb.	
No. 10, f.o.b. Pittsburgh.....	1.55c.
No. 10, f.o.b. Chicago mill.....	1.65c.
No. 10, del'd Philadelphia.....	1.86c.
No. 10, f.o.b. Birmingham.....	1.70c.
No. 10, c.i.f. Pacific Coast ports.....	2.30c.

#### Hot-Rolled and Annealed

No. 10, Pittsburgh.....	1.70c.
No. 10, Chicago mills.....	1.80c.
No. 10, Birmingham.....	1.85c.

#### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh.....	2.20c.
No. 24, f.o.b. Chicago mills.....	2.30c.
No. 24, del'd Philadelphia.....	2.48c. to 2.51c.
No. 24, f.o.b. Birmingham.....	2.35c. to 2.50c.
No. 24, c.i.f. Pacific Coast ports.....	2.90c.

#### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh.....	2.25c.
No. 10 gage, f.o.b. Chicago mills.....	2.35c.
No. 10 gage, del'd Philadelphia.....	2.48c.

#### Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.....	2.75c.
No. 20 gage, f.o.b. Chicago mills.....	2.85c.
No. 20 gage, del'd Philadelphia.....	3.06c.

#### Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	2.90c.
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#### Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh.....	2.65c.
No. 20, f.o.b. Pittsburgh.....	3.15c.

(Prices on furniture stock include stretcher leveling but not requiring.)

#### Galvanized Sheets

No. 24, f.o.b. Pittsburgh.....	2.85c.
No. 24, f.o.b. Chicago mills.....	2.95c.
No. 24, del'd Philadelphia.....	3.16c.
No. 24, f.o.b. Birmingham.....	3.00c.
No. 24, c.i.f. Pacific Coast ports.....	3.50c.

#### Long Ternes

No. 24, unassorted, 8-lb coating, f.o.b. P'gh.....	2.80c. to 3.00c.
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#### Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh.....	2.60c.
No. 20, f.o.b. Pittsburgh.....	3.10c.

#### Tin Mill Black Plate

No. 23, f.o.b. Pittsburgh.....	2.40c. to 2.50c.
No. 28, Chicago mill.....	2.50c. to 2.60c.

#### Tin Plate

Base per Box	
Standard cokes, f.o.b. P'gh district mills.....	\$4.75
Standard cokes, f.o.b. Gary.....	4.85

### Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. ....	\$9.50
15-lb. coating I.C. ....	12.00
20-lb. coating I.C. ....	13.00
25-lb. coating I.C. ....	14.10
30-lb. coating I.C. ....	14.90
40-lb. coating I.C. ....	16.70

### Hot-Rolled Hoops, Bands and Strips

Base per Lb.	
6 in. and narrower, Pittsburgh.....	1.50c. to 1.60c.
Wider than 6 in., P'gh.....	1.40c. to 1.50c.
6 in. and narrower, Chicago.....	1.70c. to 1.80c.
Wider than 6 in., Chicago.....	1.60c. to 1.70c.
Cooperage stock, P'gh.....	1.60c. to 1.70c.
Cooperage stock, Chicago.....	1.70c. to 1.80c.

#### Cold-Rolled Strips

F.o.b. Pittsburgh.....	2.00c.
F.o.b. Cleveland.....	2.00c.
Del'd Chicago.....	2.30c.
F.o.b. Worcester.....	2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	2.90c. to 3.00c.

### WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)  
(After Dec. 31, extra of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

#### To Manufacturing Trade

Bright wire.....	2.20c.
Spring wire.....	3.20c.

#### To Jobbing Trade

Base per Keg	
Standard wire nails.....	\$1.95
Smooth coated nails.....	1.95
Galvanized nails.....	3.95

Base per Lb.	
Smooth annealed wire.....	2.35c.
Smooth galvanized wire.....	2.80c.
Polished staples.....	2.50c.
Galvanized staples.....	2.75c.

### Barbed wire, galvanized.....2.60c.

Woven wire fence, No. 9 gage, per net ton.....\$55.00

Woven wire fence, No. 12 1/2 gage and lighter, per net ton.....60.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

## STEEL PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

#### Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	47	21 1/2	1/4 and 1/2	4	34
1/2 to 3/4	53	27 1/2	1/2	25	7
3/4	58	32 1/2	3/4	30	13
1	62	37 1/2	1 and 1 1/4	33	17
1 to 3	64	42 1/2	1 1/4 and 2	37	20

#### Lap Weld

2	57	45 1/2	2	25	11
2 1/2 to 6	61	49 1/2	2 1/2 to 3 1/2	30	15
7 and 8	58	45 1/2	4 to 6	32	19
9 and 10	56	43 1/2	7 and 8	31	18
11 and 12	55	42 1/2	9 to 13	28	13

#### Butt Weld, extra strong, plain ends

1/4	43	36 1/2	1/4 and 1/2	11	46
1/2 to 1	49	42 1/2	1/2 to 3/4	25	9
1 1/4	55	48 1/2	3/4 to 1	30	14
1 1/2 to 2	62	55 1/2	1 to 2	36	20
2 to 3	63	52 1/2			

#### Lap Weld, extra strong, plain ends

2	55	44 1/2	2	31	15
2 1/2 to 4	59	48 1/2	2 1/2 to 4	36	22
4 1/2 to 6	58	47 1/2	4 1/2 to 6	35	21
7 to 8	54	41 1/2	7 and 8	33	19
9 and 10	47	34 1/2	9 to 12	28	16
11 and 12	46	33 1/2			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2 1/2%, and on galvanized by 1 1/2 points with supplementary discounts of 5 and 2 1/2%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

#### Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2 1/4	1 1/4 in.	1 1/4 in.	1
2 1/2 in.	36	1 1/2 in.	8
2 3/4 in.—2 1/2 in.	46	2 in.—2 1/4 in.	13
3 in.	52	2 1/4 in.—2 1/2 in.	16
3 1/4 in.—3 1/2 in.	54	3 in.	17
4 in.	57	3 1/4 in. to 3 1/2	18
4 1/4 in. to 6 in.	46	4 in.	20
		4 1/4 in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

#### Standard Commercial Seamless Boiler Tubes

Cold-Drawn		Hot Rolled	
1 in.	61	3 in.	46
1 1/4 to 1 1/2 in.	53	3 1/4 to 3 1/2 in.	48
1 1/2 in.	57	4 in.	51
2 to 2 1/4 in.	32	4 1/4, 5 and 6	
2 1/4 to 2 1/2 in.	40		40

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard sizes take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

### Seamless Mechanical Tubing

Per Cent Off List	
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base.....	50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

## RAILS AND TRACK SUPPLIES

### Rails

Per Gross Ton	
Standard, f.o.b. mill.....	\$48.00
Light (from billets), f.o.b. mill.....	34.00
Light (from rail steel), f.o.b. mill.....	33.00

### Track Equipment

Base per 100 Lb.	
Spikes, 9/16-in. and larger.....	\$2.60
Spikes, 1/2-in. and larger.....	2.00
Spikes, boat and barge.....	2.80
Tie plate, steel.....	1.85
Angle bars.....	2.75
Track bolts, to steam railroads.....	3.50
Track bolts, to jobbers, all sizes, per 100 count.....	73 per cent off list

## BOLTS, NUTS, RIVETS AND SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List	
Machine bolts.....	75
Carriage bolts.....	75
Lag bolts.....	75
Flange bolts, Nos. 1, 2, 3 and 7 heads.....	75
Hot-pressed nuts, blank or tapped, square.....	75
Hot-pressed nuts, blank or tapped, hexagons.....	75
C.p.c. and t. square or hex. nuts, blank or tapped.....	75
Washers.....	7.00c. to 8.75c. per lb. off list

\*F.o.b. Chicago, New York and Pittsburgh.  
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

Per Cent Off List	
Semi-finished hexagon nuts.....	75
Semi-finished hexagon castellated nuts, S.A.E.....	75
Stove bolts in packages, P'gh.....	77 1/2, 25 and 10
Stove bolts in packages, Chicago.....	77 1/2, 25 and 10
Stove bolts in pkgs., Cleveland.....	77 1/2, 25 and 10
Stove bolts in bulk, P'gh.....	86
Stove bolts in bulk, Chicago.....	86
Stove bolts in bulk, Cleveland.....	86
Tire bolts.....	90 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

### Large Rivets

(1/2-in. and larger)

Base per 100 Lb.	
F.o.b. Pittsburgh or Cleveland.....	\$3.25
F.o.b. Chicago.....	70, 10 and 5

### Small Rivets

(7/16-in. and smaller)

Per Cent Off List	
F.o.b. Pittsburgh.....	70, 10 and 5
F.o.b. Cleveland.....	70, 10 and 5
F.o.b. Chicago.....	70, 10 and 5

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List	
Milled cap screws .....	80, 10, 10 and 5
Milled standard set screws, case hardened .....	90 and 5
Milled headless set screws, cut thread.....	75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread.....	85 and 10 to 85, 10, 10 and 10
Upset set screws .....	80, 10 and 5
Milled studs .....	70

Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.60c
Universal	1.60c
Sheared	1.60c

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$37.00
Cleveland	\$37.00
Chicago	\$38.00

## COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.25
Foundry, f.o.b. Connellsville prompt	\$3.25 to 4.50
Foundry, by-product, Chicago ovens	7.50
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.35 to 8.75
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b., ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.50
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.60
Gas coal, 4-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.75 to 0.90
Gas slack, f.o.b. W. Pa. mines	0.75 to 0.90

Fuel Oil	
	Per Gal. f.o.b. Raymonne, N. J.
No. 3 distillate	4.00c
No. 4 industrial	3.50c
Per Gal. f.o.b. Baltimore	
No. 3 distillate	3.50c
No. 4 industrial	3.25c
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.75c
No. 5 industrial fuel oil	2.60c
Per Gal. f.o.b. Cleveland	
No. 3 industrial fuel oil	4.42 1/2c
No. 4 distillate	3.87 1/2c

## REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-heat	Duty Brick
Duty Brick	\$38.00 \$25.00 to \$30.00
Penn.	38.00 25.00 to 30.00
Maryland	\$44.00 to \$7.00
Ohio	38.00 25.00 to 30.00
Kentucky	38.00 25.00 to 30.00
Missouri	35.00 30.00
Illinois	38.00 25.00 to 30.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$42.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

## CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$36.40 to \$38.40
4-in., del'd Chicago	39.40 to 41.40
6-in. and larger, del'd New York	\$28.20
4-in., del'd New York	31.20
6-in. and larger, Birm'ham	\$32.00 to 33.00
4-in., Birmingham	35.00 to 36.00
Class "A" and gas pipe, \$3 extra.	

## VALLEY

Per gross ton, f.o.b. Valley furnace:	
Basic	\$14.50
Bessemer	15.50
Gray forge	15.00
No. 2 foundry	14.50
No. 3 foundry	15.50
Malleable	15.50
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

## PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$15.00
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.00

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

## CHICAGO

Per gross ton at Chicago furnace:	
N'th'n No. 2 fdy.	\$16.00
N'th'n No. 1 fdy.	16.50
Malleable, not over 2.25 sil.	16.00
High phosphorus	16.00
Lake Superior charcoal	23.17
sil. 1.50, by rail	16.14
S'th'n No. 2 fdy.	27.50
Low phos., sil. 1 to 2, copper free	23.67
Silvery, sil. 8 per cent	23.67
Bess. ferroalloy, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

## ST. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	\$18.30 to 18.80
Southern No. 2 fdy., del'd St. Louis	15.52 to 15.77
Northern malleable, del'd St. Louis	18.30 to 18.80
Northern basic, del'd St. Louis	18.30 to 18.80

Freight rates 85c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.50 from Birmingham.

## NEW YORK

Per gross ton, delivered New York district:	
*Buffalo, No. 2, del'd	\$17.91 to \$18.41
East. Pa. No. 2 fdy.	15.52 to 15.77
East. Pa. No. 2X fdy.	16.02 to 16.27

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.  
\*Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

## BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

## NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil.	1.75 to 2.25, \$19.54 to \$20.04
*Buffalo, sil.	2.25 to 2.75, \$19.54 to \$20.04
*Ala., sil.	1.75 to 2.25, 19.74
*Ala., sil.	2.25 to 2.75, 20.24
*Ala., sil.	1.75 to 2.25, 15.88
*Ala., sil.	2.25 to 2.75, 16.28

Freight rates: \$5.01 all rail from Buffalo; \$9.75 all rail from Alabama and \$5.88 rail and water from Alabama to New England seaboard.  
\*All rail rate.  
†Rail and water rate.

## CINCINNATI

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	\$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

## PHILADELPHIA

Per gross ton at Philadelphia:	
East. Pa. No. 2	\$14.84 to \$15.34
East. Pa. No. 2X	15.34 to 15.84
East. Pa. No. 1X	15.84 to 16.34
Basic (del'd east. Pa.)	16.00
Malleable	18.00 to 18.50
Stand. low phos. (f.o.b. east. Pa. furnace)	22.00 to 23.00
Cop. b'g low phos. (f.o.b. furnace)	22.00 to 22.50

# Pig Iron, Ores, Ferroalloys

Va. No. 2 plain	22.04
Va. No. 2X	22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: \$4c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

## CLEVELAND

Per gross ton at Cleveland furnace:	
N'th'n No. 2 fdy. (local delivery)	\$15.50
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.50
Ohio silvery, 8 per cent	21.87
Stand. low phos., Valley	25.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

## BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnaces:	
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

## CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

## Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard	*\$72.00 to \$75.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*\$72.00 to \$75.00

## Spiegeleisen

Per Gross Ton Furnace	
Domestic, 10 to 21%	\$20.00 to \$27.00

## Electric Ferroalloy

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (less carloads)	85.00
75% (carloads)	124.00
75% (less carloads)	136.00
14% to 16% (f.o.b. Welland, Ont., in carloads)	81.00
14% to 16% (less carloads)	86.00

## Bessemer Ferroalloy

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10% steel	\$20.50
11% steel	21.00
12% steel	21.50
13% steel	22.00
14% steel	22.50

## Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6% steel	\$18.00
7% steel	18.50
8% steel	19.00
9% steel	19.50
10% steel	20.00
11% steel	20.50

## Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	\$1.08
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Ferrotungsten, less carloads	\$1.16 to 1.30
Ferromanganese, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.50c
Ferromanganese, 2% carbon	17.00c. to 17.50c.
Ferromanganese, 1% carbon	19.00c. to 20.00c.
Ferromanganese, 0.10% carbon	23.50c. to 25.00c.
Ferromanganese, 0.00% carbon	25.50c. to 27.00c.
Ferrovanadium, del. per lb. contained Va.	\$3.05 to \$3.20
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads	100.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base	85.00
Ferromolybdenum, per lb. Mo., del. v.s.	80c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	\$113.50
Silico spiegel, per ton, f.o.b. furnace, car lots	43.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	\$5 a ton higher

## Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton	
Old range Bessemer, 51.50% iron	\$4.00
Old range non-Bessemer, 51.50% iron	4.00
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.65
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68 1/2% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	9.00c.
Iron, basic and foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50% 52%	23c. to 34c.
Manganese, Brazilian, 48 to 48%	21c. to 23c.

## Fluorspar

Per Gross Ton	
Tungsten, Chinese wolframite	\$10.75 to \$11.00
Tungsten, domestic scheelite	\$10.00 to 10.50
Chrome, 45% Cr2O3 crude, c.i.f. Atlantic seaboard	18.00
Chrome, 48%, Cr2O3, c.i.f. Atlantic seaboard	20.00

## Per Net Ton

Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	\$20.81
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.81
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid, \$17.00 to 17.40	
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	32.00

# Iron and Steel Scrap

## PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting	\$9.50 to \$10.00
No. 2 heavy melting steel	8.00 to 8.50
No. 2 railroad wrought	9.50 to 10.00
Scrap rails	9.50 to 10.00
Rails 3 ft. and under	11.00 to 11.50
Sheet bar crops, ordinary	9.50 to 10.00
Compressed sheet steel	9.25 to 9.75
Hand bundled sheet steel	8.00 to 8.50
Hvy. steel axle turnings	8.00 to 8.50
Machine shop turnings	6.50 to 7.00
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Cast iron wheels	9.75 to 10.25
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.00 to 9.50
Railr. knuckles and couplers	10.00 to 10.50
Rail. coil and leaf springs	10.00 to 10.50
Rolled steel wheels	10.00 to 10.50
Low phos. billet crops	12.50 to 13.00
Low phos. sheet bar crops	11.50 to 12.00
Low phos. plate scrap	10.50 to 11.00
Low phos. punchings	10.50 to 11.00
Steel car axles	14.00 to 15.00

## CHICAGO

Delivered Chicago district consumers:

Per Gross Ton	
Heavy melting steel	\$6.50 to \$6.75
Shoveling steel	6.50 to 6.75

Frogs, switches and guards	6.50 to 6.75
Hydraulic comp. sheets	5.25 to 5.75
Drop forge flashings	4.75 to 5.25
No. 1 busheling	4.75 to 5.25
Rolled carwheels	7.25 to 7.75
Railroad tires	8.50 to 9.00
Railroad leaf springs	8.00 to 8.50
Axle turnings	5.00 to 5.50
Steel couplers and knuckles	7.00 to 7.50
Coil springs	8.50 to 9.00
Axle turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	7.50 to 8.00
Cast iron borings	3.25 to 3.75
Short shoveling turnings	3.25 to 3.75
Machine shop turnings	3.75 to 4.25
Rerolling rails	8.50 to 9.00
Steel rails, less than 3 ft.	8.00 to 8.50
Steel rails, less than 2 ft.	8.50 to 9.00
Angle bars steel	7.50 to 8.00
Cast iron carwheels	6.50 to 7.00
Railroad malleable	6.25 to 6.75
Agricultural malleable	5.75 to 6.25
*Relaying rails, 56 to 60 lb.	15.00 to 17.00
*Relay rails, 65 lb. and up	18.00 to 23.00



No. 2 busheling.....	\$2.00 to \$2.50
Locomotive tires, smooth.....	7.50 to 8.50
Pipes and flues.....	2.50 to 3.00
No. 1 machinery cast.....	6.50 to 7.00
Clean automobile cast.....	6.25 to 6.75
No. 1 railroad cast.....	6.00 to 6.50
No. 1 agricultural cast.....	5.25 to 5.75
Stove plate.....	4.75 to 5.25
Grate bars.....	5.25 to 5.75
Brake shoes.....	6.00 to 6.50

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

#### PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$6.00 to \$7.00
No. 2 heavy melting steel.....	5.00 to 5.50
No. 1 railroad wrought.....	8.50 to 9.00
Bundled sheets.....	4.50 to 5.00
Hydraulic compressed, new.....	5.00 to 5.50
Hydraulic compressed, old.....	4.50 to 5.00
Machine shop turnings.....	6.00 to 6.50
Heavy axle turnings.....	3.00 to 3.50
Cast borings (nom.).....	8.50
Heavy breakable cast.....	6.50 to 7.00
Stove plate (steel works).....	9.00 to 10.00
No. 1 low phos. hvy.....	7.50 to 8.00
Knuckles and couplers.....	7.50 to 8.00
Spilled steel wheels.....	3.50 to 4.00
No. 1 blast furnace (nom.).....	7.50 to 8.00
Spec. iron and steel pipe.....	10.00 to 11.00
Shafting.....	13.50 to 14.00
Steel axles.....	5.50 to 6.00
No. 1 forge fire.....	8.50 to 9.00
Cast iron car wheels.....	8.50 to 9.00
No. 1 cast.....	8.00 to 8.50
Cast borings (chem.).....	10.50
Steel rails for rolling.....	9.00 to 9.50

#### CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$7.00 to \$7.50
No. 2 heavy melting steel.....	6.50 to 7.00
Compressed sheet steel.....	6.75 to 7.00
Light bundled sheet stampings.....	6.00 to 6.50
Drop forge flashings.....	6.00 to 6.25
Machine-shop turnings.....	3.75 to 4.00
Short shoveling turnings.....	6.50 to 6.75
No. 1 busheling.....	7.50 to 8.00
Steel axle turnings.....	7.50 to 8.00
Low phos. billet crops.....	14.00 to 14.50
Cast iron borings.....	5.75 to 6.00
Mixed borings and short turnings.....	5.75 to 6.00
No. 2 busheling.....	7.50 to 8.00
No. 1 cast.....	7.50 to 8.00
Railroad grate bars.....	6.00 to 6.50
Stove plate.....	6.00 to 6.50
Rails under 3 ft.....	10.25 to 10.75
Rails for rolling.....	11.00 to 12.00
Railroad malleable.....	9.50 to 10.00

#### BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel.....	\$7.00
No. 2 heavy melting steel.....	5.00
Scrap.....	\$7.50 to 8.00
New hydraulic comp. sheets.....	4.00
Old hydraulic comp. sheets.....	5.00
Drop forge flashings.....	5.00
No. 1 busheling.....	7.00
Hvy. steel axle turnings.....	5.00
Machine shop turnings.....	10.00
Knuckles and couplers.....	10.00
Coll and leaf springs.....	10.00
Bolted steel wheels.....	10.00
Low phos. billet crops.....	10.50 to 11.00
Short shov. steel turnings.....	6.50 to 7.00
Short mixed borings and turnings.....	5.50 to 6.00
Cast iron borings.....	5.50 to 6.00
No. 2 busheling.....	3.50 to 4.00
Steel car axles.....	10.00 to 11.00
Iron axles.....	10.00 to 11.00
No. 1 machinery cast.....	9.00 to 9.50
No. 1 cupola cast.....	8.25 to 8.75
Stove plate.....	7.50 to 8.00
Steel rails, 8 ft. and under.....	10.50 to 11.00
Cast iron car wheels.....	8.00 to 9.00
Industrial malleable.....	8.00 to 9.00
Railroad malleable.....	8.00 to 9.00
Chemical borings.....	8.00 to 8.50

#### BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel.....	\$7.50 to \$8.00
Scrap steel rails.....	7.50 to 8.00
Short shoveling turnings.....	3.50 to 4.00
Stove plate.....	6.00
Steel axles.....	12.00
Iron axles.....	12.00
No. 1 railroad wrought.....	6.00
Rails for rolling.....	9.00 to 9.50
No. 1 cast.....	8.00 to 8.50
Tramcar wheels.....	8.50
Cast iron borings, chem.....	8.50

#### ST. LOUIS

Dealers' buying prices per gross ton:	
Selected heavy steel.....	\$6.75 to \$7.25
No. 1 heavy melting.....	6.25 to 6.75
No. 2 heavy melting.....	5.50 to 6.00
No. 1 locomotive tires.....	6.00 to 6.50
Misc. stand-sec. rails.....	6.50 to 7.00
Railroad springs.....	7.50 to 8.00
Bundled sheets.....	4.25 to 4.75
No. 2 railroad wrought.....	6.25 to 6.75
No. 1 busheling.....	6.00 to 6.50
Cast iron borings and shoveling turnings.....	4.75 to 5.25
Iron rails.....	7.00 to 7.50
Rails for rolling.....	3.00 to 3.50
Machine shop turnings.....	3.00 to 3.50
Heavy turnings.....	5.00 to 5.50
Steel car axles.....	9.50 to 10.00
Iron car axles.....	12.50 to 13.00
Wrot. iron bars and trans.....	5.00 to 5.50
No. 1 railroad wrought.....	4.75 to 5.25
Steel rails, less than 3 ft.....	8.50 to 9.00
Steel angle bars.....	6.50 to 7.00

Cast iron car wheels.....	5.50 to 6.00
No. 1 machinery cast.....	7.50 to 8.00
Railroad malleable.....	4.75 to 5.25
No. 1 railroad cast.....	5.75 to 6.25
Stove plate.....	6.00 to 6.50
Relay, rails, 60 lb. and under.....	16.00 to 16.50
Relay, rails, 70 lb. and over.....	20.00 to 21.00
Agricult. malleable.....	5.00 to 5.50

#### NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$4.25 to \$5.50
No. 2 heavy melting steel.....	2.25 to 2.50
Heavy melting steel (yard).....	2.75 to 3.00
No. 1 hvy. breakable cast.....	4.50 to 4.75
Stove plate (steel works).....	2.75 to 3.00
Machine shop turnings.....	1.00 to 1.50
Short shoveling turnings.....	1.00 to 1.50
Cast borings.....	1.00 to 1.50
No. 1 blast furnace.....	1.00 to 1.50
Steel car axles.....	9.75 to 10.25
Iron car axles (nom.).....	14.00 to 14.50
Spec. iron and steel pipe.....	2.75 to 3.00
Forge fire.....	3.25
No. 1 railroad wrought.....	4.75 to 5.00
No. 1 yard wrought, long.....	3.75 to 4.00
Rails for rolling.....	5.75 to 6.00
No. 1 cast.....	5.00 to 5.25
No. 2 cast.....	4.00 to 4.50
Stove plate (foundry).....	4.00 to 5.00
Malleable cast (railroad).....	5.50 to 6.00
Cast borings (chemical).....	6.00 to 6.50

Per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$3.00
No. 1 hvy. cast (cupola size).....	7.50
No. 2 cast.....	6.50

#### PITTSBURGH

Base per Lb.	
Plates.....	2.85c
Structural shapes.....	2.85c
Soft steel bars and small shapes.....	2.60c
Reinforcing steel bars.....	2.60c
Cold-finished and screw stock.....	3.10c
Rounds and hexagons.....	3.60c
Squares and flats.....	3.95c
Hoops.....	3.60c
Hot-rolled annealed sheets (No. 24).....	3.15c
25 or more bundles.....	3.05c
Galv. sheets (No. 24).....	3.10c
Hot-rolled sheets (No. 10).....	3.10c
Galv. corrug. sheets (No. 28).....	3.74
Squares (less than 3750 lb.).....	2.50c
Spikes, large.....	2.75c
Small.....	2.90c
Reat.....	3.00c
Track bolts, all sizes, per 100 count.....	70 and 10 per cent off list
Machine bolts, 100 count.....	70 and 10 per cent off list
Carriage bolts, 100 count.....	70 and 10 per cent off list
Nuts, all styles, 100 count.....	73 and 10 per cent off list
Large rivets, base per 100 lb.....	\$3.00
Wire, black, soft ann't'd, base per 100 lb.....	2.75
Wire, galv. soft, base per 100 lb.....	3.20
Common wire nails, per keg.....	2.35
Cement coated nails, per keg.....	2.35

\*On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

#### CHICAGO

Base per Lb.	
Plates and structural shapes.....	3.00c
Soft steel bars.....	2.75c
Reinforcing bars, billet steel.....	1.75c
Rail steel reinforcement.....	1.55c to 1.65c
Cold-fn. steel bars and shafting.....	3.10c
Rounds and hexagons.....	3.10c
Plats and squares.....	3.60c
Bands, 1/2 in. (in Nos. 10 and 12 gage).....	2.95c
Hoops.....	3.50c
Hot-rolled annealed sheets (No. 24).....	3.10c
Galv. sheets (No. 24).....	3.10c
Hot-rolled sheets (No. 10).....	3.20c
Spikes (1/2 in. and lighter).....	3.45c
Track bolts.....	4.30c
Rivets, structural.....	3.75c
Rivets, boiler.....	3.75c

Per Cent Off List	
Machine bolts.....	73
Carriage bolts.....	73
Coach and lag screws.....	73
Hot-pressed nuts, sq., tap, or blank.....	73
Hot-pressed nuts, hex., tap, or blank.....	73
No. 8 black ann't'd wire, per 100 lb.....	\$3.45
Comm. wire nails, base per keg.....	2.30
Cement c't'd nails, base per keg.....	2.30

#### NEW YORK

Base per Lb.	
Plates and struc. shapes.....	2.70c to 3.10c
Soft steel bars, small shapes.....	2.70c to 3.10c
Iron bars.....	3.24c
Iron bars, Swed. charcoal.....	6.00c to 6.50c
Cold-fn. shafting and screw stock.....	3.40c
Rounds and hexagons.....	3.40c
Plats and squares.....	3.90c
Cold-fn. strip, soft and quarter hard.....	4.35c
Hoops.....	3.75c
Bands.....	3.40c
Hot-rolled sheets (No. 10).....	3.00c to 3.25c
Hot-rolled ann't'd sheets (No. 24).....	3.60c
Galvanized sheets (No. 24).....	4.00c
Long term sheets (No. 24).....	5.00c
Standard tool steel.....	12.00c
Wire, black annealed (No. 10).....	3.60c
Wire, galv. annealed (No. 10).....	4.05c
Tire steel, 1/2 x 1/4 in. and larger.....	3.40c
Smooth finish, 1 to 2 1/4 x 1/4 in. and larger.....	3.75c
Open-hearth spring steel, bands.....	4.50c to 7.00c
Common wire nails, base, per keg.....	\$2.60

#### BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$4.00 to \$4.25
Scrap T rails.....	3.50 to 4.00
Machine shop turnings.....	.80 to 1.00
Cast iron borings.....	1.05
Bundled skeleton, long.....	2.00 to 2.50
Forge flashings.....	3.00 to 3.50
Blast furnace scrap.....	0.50 to 1.00
Shafting.....	9.50 to 10.00
Steel car axles.....	9.00 to 9.50
Wrought pipe.....	4.00 to 4.25
Rails for rolling.....	6.00 to 6.50
Cast iron borings, chemical.....	7.00 to 7.25

Per gross ton delivered consumers' yards:

Textile cast.....	\$7.00 to \$7.50
No. 1 machinery cast.....	7.50 to 8.00
Stove plate.....	5.00 to 5.25
Railroad malleable.....	10.50 to 11.00

#### CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel.....	\$6.00 to \$7.00
Scrap rails for melting.....	8.00 to 8.50
Loose sheet clippings.....	1.50 to 2.00
Bundled sheets.....	4.75 to 5.25
Cast iron borings.....	2.75 to 3.25
Machine shop turnings.....	3.25 to 3.75
No. 1 busheling.....	4.25 to 4.75
No. 2 busheling.....	2.50 to 3.00
Rails for rolling.....	9.00 to 9.50
No. 1 locomotive tires.....	8.50 to 9.00
Short rails.....	11.75 to 12.25
Cast iron car wheels.....	8.25 to 8.75
No. 1 machinery cast.....	10.00 to 10.50
No. 1 railroad cast.....	8.75 to 9.25

Machine bolts, cut thread:	
1/2 x 6 in. and smaller.....	.65 to .85 and 10
1 x 30 in. and smaller.....	.65 to .85 and 10
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller.....	.65 to .85 and 10
1/2 x 20 in. and smaller.....	.65 to .85 and 10
Boiler Tubes:	
Lap welded, 2-in.....	\$19.00
Seamless welded, 2-in.....	20.25
Charcoal iron, 2-in.....	20.25
Charcoal iron, 4-in.....	27.00

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

#### ST. LOUIS

Base per Lb.	
Plates and struc. shapes.....	3.25c
Bars, soft steel or iron.....	3.00c
Cold-fn. rounds, shafting, screw stock.....	3.35c
Hot-rolled annealed sheets (No. 24).....	2.90c
Galv. sheets (No. 24).....	3.35c
Hot-rolled sheets (No. 10).....	3.45c
Black corrug. sheets (No. 24).....	3.80c
Galv. corrug. sheets.....	4.40c
Structural rivets.....	4.00c
Boiler rivets.....	4.60c

Per Cent Off List	
Tank rivets, 1/2-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	73
Carriage bolts.....	73
Lag screws.....	73
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more.....	73
Less than 200 lb.....	63
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	73
Less than 200 lb.....	63

#### PHILADELPHIA

Base per Lb.	
Plates, 1/4-in. and heavier.....	2.45c
Structural shapes.....	2.45c
Soft steel bars, small shapes, iron bars (except bands).....	2.45c
Reinforcing steel bars, sq., twisted and deformed.....	2.30c
Cold-fn. steel, rounds and hex.....	3.30c
Cold-fn. steel, sq. and flats.....	3.80c
Steel hoops.....	3.00c
Spring steel, No. 12 to 2 1/16-in., incl.....	3.75c
Hot-rolled annealed sheets (No. 24).....	3.00c
Hot-rolled sheets (No. 10).....	3.55c
Galvanized sheets (No. 24).....	3.75c
Hot-rolled and annealed sheets (No. 10).....	3.05c
Diam. pat. floor plates, 1/4 in.....	5.00c
Swedish iron bars.....	6.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

#### CLEVELAND

Base per Lb.	
Plates and struc. shapes.....	2.95c
Soft steel bars.....	2.75c
Reinforcing steel bars.....	1.75c to 1.95c
Cold-fn. rounds and hex.....	3.10c
Cold-fn. flats and sq.....	3.80c
Hoops and bands, No. 12 to 1/4 in., inclusive.....	3.00c
Hoops and bands, No. 13 and lighter.....	2.85c
Cold-finished strip.....	6.55c
Hot-rolled annealed sheets (No. 24).....	3.25c
Galvanized sheets (No. 24).....	3.75c
Hot-rolled sheets (No. 10).....	3.00c
Black ann't'd wire, per 100 lb.....	\$2.75
No. 9 galv. wire, per 100 lb.....	3.30
Comm. wire nails, base per keg.....	2.35

\*No base, including boxing and cutting to length.

#### CINCINNATI

Base per Lb.	
Plates and struc. shapes.....	3.25c
Bars, soft steel or iron.....	3.00c
New billet reinforcing bars.....	2.90c
Rails steel reinforcing bars.....	3.00c
Hoops.....	3.90c
Bands.....	3.30c

Burnt cast.....	4.25 to 4.75
Stove plate.....	4.25 to 4.75
Agricultural malleable.....	8.00 to 8.50
Railroad malleable.....	9.00 to 9.50

#### DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting.....	\$3.25 to \$3.75
Borings and short turnings.....	3.75 to 4.25
Long turnings.....	2.75 to 3.25
No. 1 machinery cast.....	8.00 to 8.50
Automotive cast.....	10.25 to 10.75
Hydraulic comp. sheets.....	3.25 to 3.75
Stove plate.....	4.25 to 4.75
New No. 1 busheling.....	4.25 to 4.75
Old No. 2 busheling.....	2.75 to 3.25
Sheet clippings.....	2.75 to 3.25
Flashings.....	4.50 to 5.00

#### CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	



## Galvanizers Discuss Sales Promotion

Methods of stimulating interest in galvanized products formed the principal topic of discussion at the fourteenth annual convention of the American Zinc Institute at Hotel Statler, St. Louis, April 19, 20 and 21.

During the year, the galvanizers, in cooperation with the institute, had spent \$42,774 in salaries, advertising and other selling expenses in behalf of better galvanizing, the executive committee reported. Subscriptions totaled \$53,963.

J. D. Conover, secretary of the institute, explained how inefficient galvanizing had hurt the business by destroying confidence, steel sheets which were only lightly coated with zinc not wearing and therefore injuring the galvanizing industry, whereas sheets properly covered with zinc endured and gave satisfaction. The standard or "Seal of Quality" of the institute guarantees a coating of 2 oz. of zinc to the square foot of steel sheet.

L. E. Kunkler and R. E. Axline, of Los Angeles, explained the use of a blower method to force zinc coating over metal, wood or other material.

Officers were re-elected as follows:

President, Ralph M. Roosevelt, Eagle-Picher Lead Co., New York; vice-presidents, A. P. Cobb, John A. Robinson and J. O. Elton; secretary, J. D. Conover, and treasurer, Howard I. Young.

## Alloyed Puddled Wrought Iron Announced

A new development in the manufacture of wrought iron is announced by the Highland Iron & Steel Co., Chicago, an associate of the American Chain Co., Inc. This is the production of a wrought iron alloyed with nickel, with copper, with nickel and molybdenum and with copper and molybdenum.

The introduction of alloys in wrought iron opens greater fields of usefulness for this material without changing in any way its fibrous structure, says the statement. At the same time it results in a 25 per cent increase in the strength of the material in the as-rolled condition.

Of these alloys, wrought iron with nickel alone and with nickel and molybdenum have outstanding characteristics, says the company. Both have shown a marked increase in fatigue-resisting properties. Heat-

treated nickel and nickel and molybdenum alloyed wrought iron show an increase in strength of 40 to 50 per cent over ordinary wrought iron.

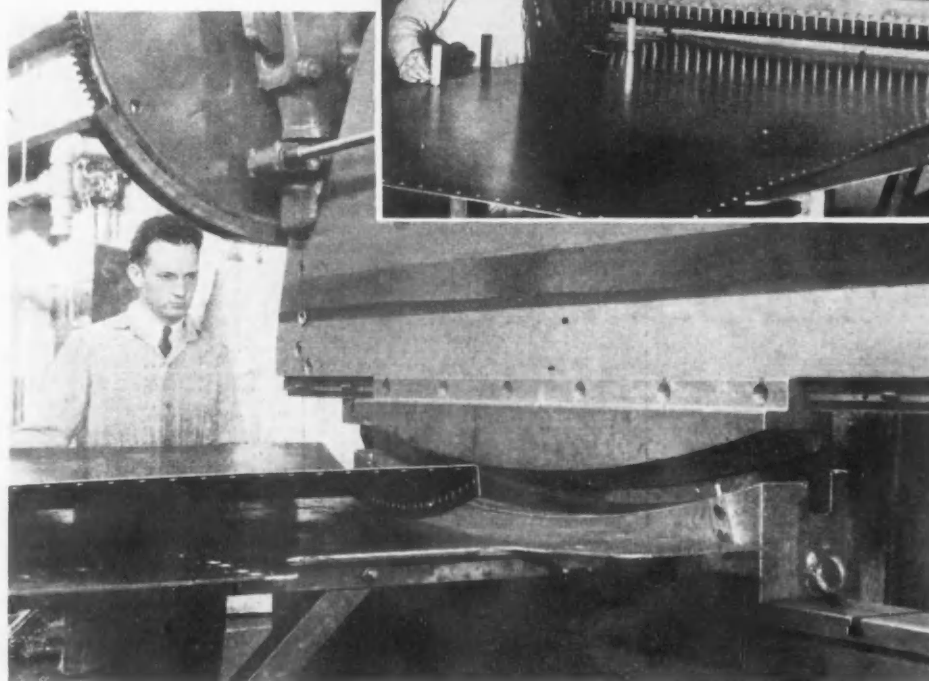
## Cold Rolling Mill for Wide Sheets

A mill for heavy cold rolling built by Fraser & Chalmers, Ltd., was described in the course of a paper read before the West of Scotland Iron and Steel Institute by James Bryden, vice-president of the association and works manager, Smith & McLean, Ltd., Glasgow, on the manufacture of steel sheets. The mill is of the Bliss cluster type.

The working rolls are of nickel-chrome steel 14 in. in diameter and 54 in. long with 10-in. necks and the backing rolls are 29½ in. in diameter with 17-in. necks. Roller bearings are mounted on the necks of the backing rolls of a capacity to carry "a spreading force of 3,500,000 lb. when operating at 27 r.p.m., which represents 100 ft. a minute through the mill."

The mill is designed to give a 30 to 35 per cent draft on 48-in. width sheets and is driven by a 250-hp. 460-volt compound-wound motor. The mill including rolls weighs about 180 tons.

## SOMETHING NEW IN TOOL PHOTOGRAPHY



THESE pictures were taken at night, in an attempt by the Cincinnati Shaper Co. to obtain something different in the way of photographic illustration. The upper picture shows the multiple punching of a tank plate, while the lower one depicts the flanged and curved plate section after going through the flanging operation.

# State Trade Barriers Create New Problem for Industry

(Concluded from page 1019)

the purpose of fixing or regulating the price of materials to be used in any such building or buildings.

In Wisconsin there is no law barring the purchase of materials produced in other States, but certain sections of the statutes provide and it is the policy of the State generally to award contracts for materials and to make purchases giving preference to Wisconsin dealers and manufacturers, only in the case that Wisconsin products are offered by low bidders, or when products are offered at a price equal to products, equipment or materials manufactured outside of the State. However, in taking bids recently on highway bridges, the State asked only Wisconsin fabricators to quote.

In North Dakota "all boards or commissions purchasing material for use in making alterations, repairs or additions, or in erecting new buildings, and all contractors making such alterations, repairs or additions, or erecting new buildings, or improvements therewith or pertaining thereto, shall always, price, fitness and quality being equal, prefer materials manufactured or produced within the State of North Dakota, and shall next prefer such as have been partially manufactured or produced in North Dakota." The special provision referring to the erection of the State capitol building, mentioned above, specifically provides that "all material shall be procured in the State of North Dakota, providing the same are products of said State and can be procured and delivered at the site at a cost not exceeding 5 per cent more than the lowest amount for which material equally good can be procured elsewhere."

The Oklahoma law merely provides that preference shall be given materials produced in the State when quality and price are equal.

In Missouri all requests for bids on articles to be purchased at public expense shall contain the following paragraph: "By virtue of statutory authority, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, made or grown within the State of Missouri." It is also provided that public buildings are to be erected of State products when consistent, although this section goes on to say that the "products of the various quarries and mines of this State shall be provided when same can be furnished on as favorable terms and of equal quality."

The law in Colorado providing that in State work preference shall be given to goods produced, grown or manufactured within the State, and

that a premium of not to exceed 5 per cent may be paid for such materials as against competition from other States, was passed several years ago. As Colorado has a large steel plant within its borders this has made it difficult for other companies to compete in that territory. The Colorado Manufacturers' Association and the Denver Chamber of Commerce have been very active in a "Buy-It-In-This-Market-Campaign" supporting the State law.

## Municipal Purchases Also Affected

The law in Wyoming, which was passed within the past year, is practically identical with the one in effect in Colorado, and was enacted largely as a result of competition between two companies manufacturing competitive products in the two States. It exemplifies the reprisal measures which may be taken by the various States. In both Colorado and Wyoming State laws regarding home products apply to municipalities in those States in addition to the State bureaus.

The practice in Texas is typical of that in a number of States which suggest that preference be given local products when the price and quality are equal, even though no compulsion is attendant. In Texas, fabricators are notified on the award of contracts that it is desired by the State authorities to obtain the best possible prices on materials required, and further that contractors bidding on such work get the benefit of the best possible price. The State would not suggest or request that any contractor pay more for a product in the State of Texas than he could buy the same or an equal product outside of the State. However, the commission prefers contractors to purchase Texas-manufactured products from Texas firms when

they can obtain such materials and products at the same or better prices than they can obtain outside of the State.

The State Legislature has also passed a resolution to the effect that it is to be the policy of the State of Texas to require the use of American-made materials in the construction of roads, bridges and public buildings. While this resolution was passed, and is in effect on a majority of materials, foreign reinforcing steel is still being used in the construction of Texas roads owing to the extremely low price at which this class of material is available.

A great many States prefer to purchase home-manufactured products for use in State projects as a matter of policy, but are not forced to do so by law. Most of them also insist upon the employment of local labor on State construction projects. In some cases legislation requiring the purchase of home-manufactured goods may not be passed, because it would conflict with other provisions of law requiring the letting of work to the lowest bidder. New York, for instance, has such a law and, while the State materials are recommended on public improvements, their purchase is not mandatory unless local manufacturers submit the lowest bids.

Although specific laws represent the most extreme form of artificial trade barriers, restrictions of the same general nature are applied other than through legislation. Public departments and bureaus have set up local origin requirements in their purchase orders and specifications. Some States resort to taxation of out-of-the-State products that compete with equivalent but slightly different home products. Elsewhere "Buy-In-The-State" movements are carried on by publicity agents. The same purpose is behind all of these schemes, that is the fostering of home production temporarily by beating other States to such plans. As soon as the same strategy is adopted in other States, the whole process becomes futile.

## Progress in Research at Mellon Institute

ACCORDING to the *Nineteenth Annual Report* of the director, Dr. E. R. Weidlein, to the trustees of Mellon Institute of Industrial Research, Pittsburgh, Pa., the sum of \$722,541 was received by the institution from industrial fellowship donors during the fiscal year ended Feb. 29, 1932. The total amount of money appropriated by donors to the institute for the past 21 years was \$8,277,018, all of which was expended in defraying the cost of scientific investigations. Throughout the year covered by the report 75 industrial fellowships, employing 176 scientists and engineers, were in operation. At the close of the year 58 fellowships were active, and of these 28 have been at work for

5 years or longer and 13 have concluded more than 10 years of research.

In reviewing the progress that has been made since 1911, when the industrial fellowship system was established at the University of Pittsburgh, Doctor Weidlein points out that Mellon Institute has had fellowships on 230 distinct subjects, on which 775 scientists and engineers have been engaged. In all, during the period of 1911-1932, 313 fellows and 357 fellowship assistants of the institute have completed their services to science and technology in the institution and have entered the fields of industry and education.

*The Iron Age, May 5, 1932—1051*

# PLANT EXPANSION AND EQUIPMENT BUYING

## Machine Tool Markets Continue Dull

April Business Not Above That of March  
and Possibly Lower in Some  
Instances

**A**S business in many metal-working lines has shown no improvement, on the contrary having slipped a little in April, it is not surprising that machine tool trade holds out no definite promise of early gains.

The Ford Motor Co. is reported to

have placed orders for some crankshaft equipment and an order for \$100,000 worth of presses from another source is in prospect. Otherwise, there are no high spots in the machinery markets.

In most sections dealers and makers of tools are getting nothing ex-

cept an occasional order for one tool. Even repair parts, for which there was a fairly active demand a month or two ago, have lapsed into dullness.

April business certainly showed no gain over that of March, and in some cases is believed to have lost a little ground.

### ◀ NORTH ATLANTIC ▶

**Flakice Corp.**, 205 Water Street, Brooklyn, has leased one-story building at 574-604 Ferry Street, Newark, N. J., for new machine shop and experimental department.

**Superintendent of Lighthouses**, Staten Island, N. Y., asks bids until May 9 for quantity of galvanized chain link fence for Watervliet, N. Y. (Proposal 40133); until May 24 for flashing lens panels (Proposal 40119).

**Board of Water Supply**, New York, 346 Broadway, plans power plant in connection with water supply reservoir and system at Rondout Creek, Ulster County.

**Pedersen Primer Mfg. Co., Inc.**, Long Island City, has been organized by H. Pedersen, 568 Eighty-first Street, Brooklyn, and I. F. Halton, 4517 Utopia Parkway, Flushing, L. I., to manufacture primers and kindred equipment for internal combustion engines.

**Anaconda Copper Mining Co.**, 25 Broadway, New York, is arranging for production of copper and brass tubing at works of Canadian subsidiary, Anaconda-American Brass, Ltd., New Toronto, and plans to have tube mill unit ready for service in about 60 days. Company recently completed plant at that place costing over \$1,000,000.

**Niagara Hudson Power Corp.**, Albany, N. Y., has secured permission for steel tower transmission line in Westchester County for connection with system of New York Edison Co., New York, making continuous line from Albany to New York. Cost about \$1,435,000.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until May 10 for three forged steel crankshafts (Schedule 7957), road-building attachments, container bodies, ventilating sets, electric fuses, vacuum tubes and other equipment for Brooklyn Navy Yard.

**Diamond Sheet Metal Specialties, Inc.**, Brooklyn, has been organized by Louis Salzberg, 507 Fifth Avenue, and Samuel Shaine, 705 Shepherd Avenue, both Brooklyn, to manufacture metal refuse containers and kindred sheet metal products.

**Department of Water Supply, Gas and Electricity**, Municipal Building, New York, is planning extensions and improvements in pumping plant at Springfield, near Jamaica, L. I. Cost about \$40,000 with equipment.

**Hartol Products Corp.**, 117 Liberty Street, New York, oil products, affiliated with Hartol Refining Corp., same address, has leased property of Richfield Oil Corp. at Bergen Point, Bayonne, N. J., 340 x 1051 ft., for new bulk storage and distributing plant.

**Commanding Officer**, Picatinny Arsenal, near Dover, N. J., asks bids until May 9 for two centrifugal belt-driven pumps (Circular 312), until May 10 for 16,500 detonators for rifle grenade (Circular 308), until May 16 for turbine alternator, steam back pressure for power house (Circular 310).

**Air Cruisers, Inc.**, 568 Park Avenue, West New York, N. Y., manufacturer of airplane

equipment and accessories, leased one-story factory, 25,000 ft. floor space, at Clifton, N. J., for branch plant.

**Board of Education**, 31 Green Street, Newark, N. J., asks bids until May 11 for electric motors, generators and switchboard, print shop supplies, iron and steel, hardware, electrical supplies and other equipment. R. D. Argue is secretary.

**Thomson-Walker-Taft, Inc.**, Clifton, N. J., has been organized by Ashley M. Thomson, 238 Carlton Terrace, Teaneck, N. J., Robert Walker and Frank W. Taft, both Clifton, capital \$100,000, to manufacture oil burners and oil-burning equipment.

**Gilby Alloy Co.**, Belleville N. J., recently organized by Walter Gilby, Belleville, has taken over factory at 850-54 Mount Prospect Avenue, Newark, for new plant for manufacture of nickel chrome and other metal alloys in round wire, flat ribbons, etc., for resistance wires. Mr. Gilby was formerly connected with Gilby Wire Co., 152 Riverside Avenue, Newark.

**Roto Engraving Co.**, East Bound Brook, N. J., manufacturer of steel engraving plates for printing wrapping papers, etc., plans rebuilding two-unit plant recently destroyed by fire. Loss over \$35,000 with equipment.

**State Board of Education**, State House, Trenton, N. J., has revised plans and will ask bids in about 60 days for two-story and basement mechanical shop, 70 x 90 ft., at New Jersey State School for Deaf, Trenton Junction, including improvements in present unit. Cost over \$70,000 with equipment. Guilbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

**Department of Public Safety**, City Hall Annex, Philadelphia, Kern Dodge, director, asks bids until May 13 for wire and cable, posts, cross-arms and kindred line equipment for electrical bureau.

**Supply Officer**, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until May 9 for quantity of aircraft engine tools (Aero Req. 1354) and 25 variable tuning condensers (Aero Req. 1272).

**Pierce, Butler & Pierce Mfg. Corp.**, 282 James Street, Syracuse, N. Y., manufacturer of boilers, radiators and other heating equipment, has leased building at Nineteenth Street and Glenwood Avenue, Philadelphia, for factory branch, storage and distributing plant.

**Lehigh Water Co.**, Easton, Pa., will soon begin erection of new filtration plant. Cost about \$70,000 with machinery, including reinforcing steel, etc.

**Delco Appliance Corp.**, 391 Lyell Avenue, Rochester, N. Y., will give over large part of plant to manufacture of pressure oil burners of atomizing type, to be marketed as Delco Heat, recently perfected. Company is affiliated with General Motors Corp., Detroit.

**Seneca Iron & Steel Co.**, Maple Avenue, Blasdell, Buffalo, is arranging for early resumption of operations at West plant, following curtailment for over a year, and will run on full time schedule. Company has received

a large order for material for automobile manufacture.

**Williams Elmaco Corp.**, Syracuse, N. Y., has been organized by Benjamin B. Williams, 110 Lincoln Park Drive, and associates, to manufacture lamps and kindred products.

**Cohoes Rolling Mill Co.**, Cohoes, N. Y., informs THE IRON AGE that the item appearing in April 28 issue, page 1006, that it will discontinue production of wrought iron pipe, is incorrect. Company states that it has no intention of discontinuing this line of its business.

### ◀ SOUTH CENTRAL ▶

**Swift & Co.**, Union Stock Yards, Chicago, let general contract to G. A. Miller & Co., Inc., Tampa, Fla., for two-story packing plant, 95 x 140 ft., at Mobile, Ala. Cost \$90,000 with equipment.

**United States Engineer Office**, Memphis, Tenn., asks bids until May 10 for one steam engine (Circular 618).

**Ford Motor Co.**, Dearborn, Mich., is resuming production at branch assembling plant at New Orleans. About 1000 men will be given employment for initial operations, with addition of 500 men within a fortnight.

**Union Light, Heat & Power Co.**, Covington, Ky., plans extensions in transmission line from Fort Mitchell to Latonia, Ky., and vicinity. Cost about \$40,000.

**United States Engineer Office**, Nashville, Tenn., asks bids until May 9 for steel wire hoisting cable (Circular 107).

**Peoples Compress Co.**, Homer, La., is planning installation of additional equipment, including high density standard compress equipment. Cost about \$25,000.

**Athens Stove Works**, Athens, Tenn., let general contract to Nicholson Construction Co., 102 West Clinch Street, Knoxville, Tenn., for one-story addition, 120 x 200 ft. Part of unit will be used as a foundry. Cost over \$45,000 with equipment.

### ◀ SOUTH ATLANTIC ▶

**Bureau of Prisons**, Department of Justice, Washington, asks bids until May 9 for one full crawler type tractor (Schedule 592) and one standard leaning wheel grader with scarifier (Schedule 593).

**United States Engineer Office**, Navy Building, Washington, asks bids until May 11 for quantity of stop and check valves (Circular 126).

**Ford Motor Co.**, Dearborn, Mich., has resumed production at branch assembling plant, Norfolk, Va., and will operate on five-day week schedule, giving employment to close to 2000 workers.

**General Purchasing Officer**, Panama Canal, Washington, asks bids until May 9 for spur



# TO MEET *exacting* WELD REQUIREMENTS

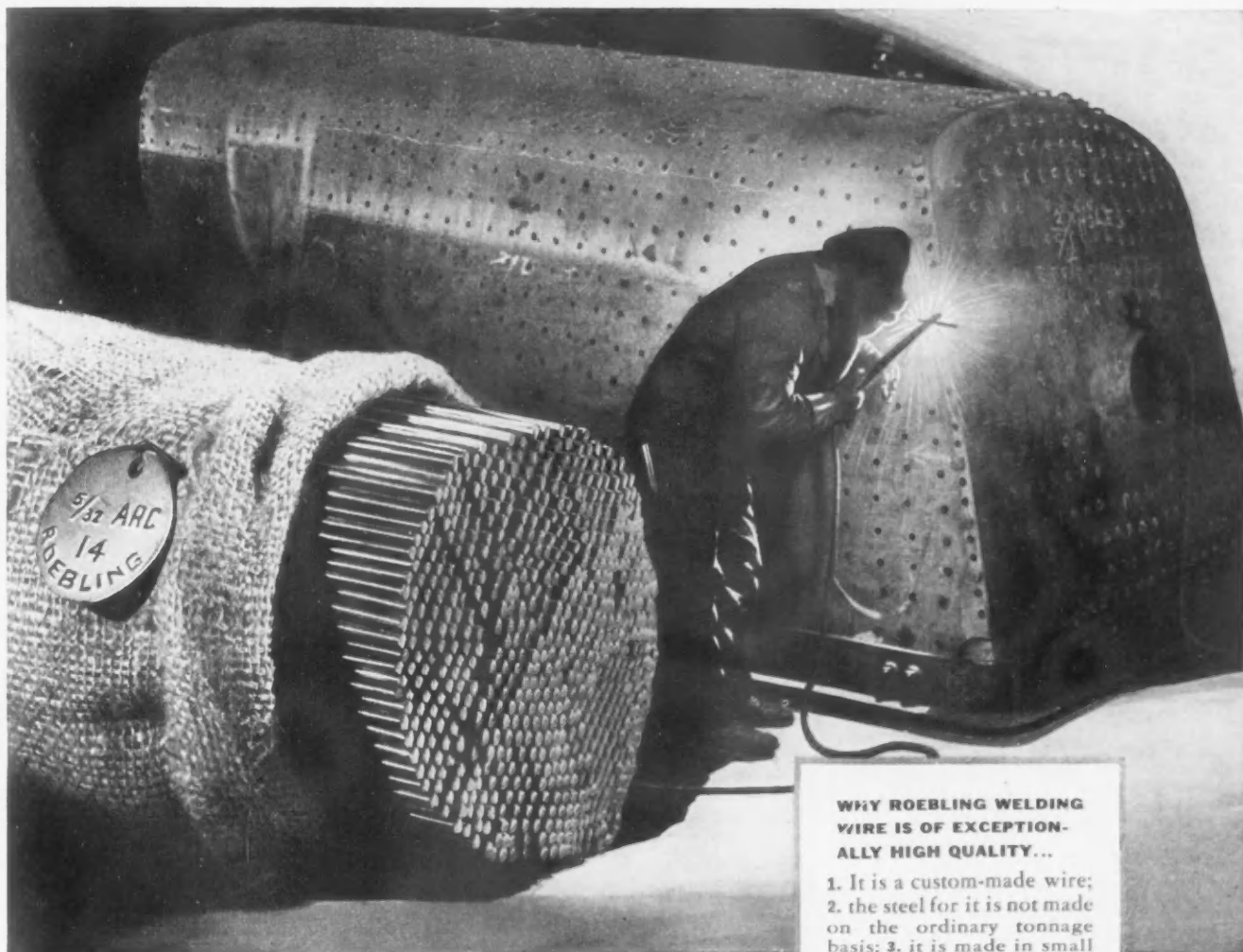
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gear involute cutters, one set of spur gear cutters, 200 cable support racks, motor-driven blower, 50 iron wheelbarrow wheels, 10,000 ft. bare wire for radio service and other mechanical equipment (Schedule 2748); until May 18 for hoisting drums, cable sheaves, insulated wire, rigid steel conduits, electric motors, transformers, steel drums, manhole frames and covers, etc. (Schedule 2750).

**Bahan Textile Machinery Co.**, Greenville, S. C., manufacturer of textile machinery and parts, has taken over two-story building on South Hudson Street, 40 x 100 ft., for new plant unit.

**Bureau of Supplies and Accounts, Navy Department**, Washington, asks bids until May 10 for two motor-driven thread milling machines (Schedule 7950) for Washington yard, two electric-heated combination sterilizers (Schedule 7979) for Hampton Roads Navy Yard, parts for motorboat gasoline engines and gasoline exhaust manifolds (Schedule 7943) for Hampton Roads and Mare Island yards, acetylene compressor (Schedule 7845); until May 17 for shaft revolution indicator equipments (Schedule 7922) for Eastern yards, circulating and condensate pumps, spare parts, and dynamo condenser (Schedule 7934) for New York or San Francisco yards, turbo-generator sets, accessories and spare parts (Schedule 7924) for New York or San Francisco yards, lighting and power cable (Schedule 7965) for Eastern and Western yards.

**Consolidated Gas, Electric Light & Power Co.**, Lexington Building, Baltimore, has taken out permit for new gas holder in Jones Falls Valley for storage and distribution, 218 ft. diameter and 229 ft. high, capacity 7,000,000 cu. ft. Cost \$436,000 with operating equipment.

**North Carolina Exploration Co.**, Fontana, N. C., plans electrification of copper mining properties in Swain County.

## ◀ CENTRAL DISTRICT ▶

**Golden-Anderson Valve Specialty Co.**, Fulton Building, Pittsburgh, manufacturer of valves and kindred steam specialties, plans rebuilding part of plant at Monessen, Pa., recently destroyed by fire. Loss about \$85,000 with equipment.

**Irwin Auto & Machine Co.**, Greensburg, Pa., plans rebuilding shops recently destroyed by fire. R. C. Shoemaker is head.

**Board of Education**, Oil City, Pa., plans manual training department in new four-story and basement senior high school. Bids will be asked on general contract in May. Cost about \$230,000. W. H. Crosby, Beers Building, is architect.

**Pennsylvania Railroad Co.**, Pennsylvania Station, Pittsburgh, has applied for permission to build a whirler crane on pile foundations on Ohio River at Conway. Company plans rebuilding maintenance of way storage and distributing plant at Lawrence Junction yards, near New Castle, Pa., recently damaged by fire.

**H. J. Heinz Co.**, 1062 Progress Street, Northside, Pittsburgh, plans multi-story addition to food canning plant at Leamington, Ont., operated by Canadian subsidiary. Cost over \$200,000 with machinery.

**Hinde & Dauch Paper Co.**, Decatur Street, Sandusky, Ohio, manufacturer of corrugated paperboard and fiber boxes and containers, has awarded general contract to W. N. Reynolds, Winston-Salem, N. C., for new plant at Winston-Salem. Cost about \$150,000 with machinery.

**Medusa Portland Cement Co.**, Sandusky, Ohio, has resumed operations at Bay Bridge mill, following shutdown since last September.

**Village Council**, Amherst, Ohio, has plans for extensions and improvements in municipal electric light and power plant. Cost about \$75,000, of which close to \$60,000 will be expended for equipment. F. N. Straus, 2613 Queenstown Road, Cleveland, is engineer.

**Akron Universal Vending Machine, Inc.**, Akron, Ohio, care of Ernest E. Zesiger, Second National Bank Building, has been organized by Thomas Franklin and Frank B. Brown, Akron, to manufacture vending machines and parts.

**Contracting Officer, Material Division**, Wright Field, Dayton, Ohio, asks bids until May 17 for 1400 control pulleys (Circular 367).

**Electric Auto-Lite Co.**, Champlain and Mulberry Streets, Toledo, Ohio, manufacturer of automobile starting and lighting equipment, has acquired minority interest in Mueller Brass Co., Port Huron, Mich. Mueller company and American Enameled Magnet Wire Co., Port Huron, a subsidiary of Electric Auto-Lite Co., are developing new line of copper pipe fittings.

**Board of Trustees, Northern Ohio University**, Ada, Ohio, has acquired former plant of

McCurdy Mfg. Co., bankrupt, and will remodel for new engineering laboratory, including mechanical and electrical departments.

**Wheeling Structural Steel Co.**, Wheeling, W. Va., will resume operations at branch plant at Martins Ferry, Ohio, May 15, following curtailment for several months.

**City Council**, Shelby, Ohio, will take bids soon for one-story addition to municipal electric light and power plant. Cost about \$85,000 with equipment. Froelich & Emery, Second National Bank Building, Toledo, Ohio, are consulting engineers.

**Quaker Oats Co.**, 141 West Jackson Boulevard, Chicago, let general contract to James Stewart Corp., 343 South Dearborn Street, for new grain elevator at Akron, Ohio. Cost about \$275,000 with equipment.

**Hobart Cabinet Co.**, Troy, Ohio, manufacturer of cabinets, bins, etc., has leased former plant of Waco Aircraft Co. for expansion.

**Department of Public Service**, Zanesville, Ohio, plans installation of electric-operated pumping machinery and auxiliary equipment in new pumping plant for municipal waterworks in Putnam district. Charles H. Duvall is waterworks engineer.

**Cummins Engine Co.**, Columbus, Ind., manufacturer of automobile engines, parts, etc., has asked bids on general contract for one-story and basement addition, 190 x 200 ft. Cost over \$90,000 with equipment. Foster Engineering Service Co., Indiana Pythian Building, Indianapolis, is architect and engineer.

**American Metalcraft, Inc.**, Indianapolis, has been organized by A. J. Gibbons and H. R. DeWolf, 3025 North Meridian Street, to manufacture metal products.

**Department of Municipal Waste**, 2655 Franklin Street, Detroit, has been authorized by City Council to build four refuse and garbage incinerator plants in different parts of city. Cost \$2,000,000 with power, conveying unloading and other equipment.

**Kewaunee Mfg. Co.**, Kewaunee, Wis., manufacturer of laboratory furniture, has resumed operations at branch plant at Adrian, Mich., after shutdown of about four months. Additional equipment has been installed for manufacture of steel furniture for laboratories, schools, etc.

**Common Council**, Elk Rapids, Mich., plans installation of electric-operated pumping machinery in new station for municipal sewage system. Francis Engineering Co., Saginaw, Mich., is engineer.

**Constructing Quartermaster**, Selfridge Field, Mich., asks bids until May 17 for a refrigerating system (Circular 27).

**Paramount Radio & Television Mfg. Co.**, Detroit, has been organized by Alfred and Fred A. Ettlinger, 7642 Woodward Avenue, to manufacture radio and television equipment, parts and assembled sets.

**Gibson Refrigerator Co.**, Greenville, Mich., manufacturer of electric refrigerators, is running on a full time, 24-hr., seven-day week schedule, giving employment to about 4000 persons.

**Flint Nut Co.**, Flint, Mich., recently organized by Lawrence Rothenberg and Thomas H. Evans, has purchased plant of Acorn Nut Co. for manufacture of nuts, bolts, studs, automobile parts, etc. Morton L. Jones will be manager.

**Aluminum Industries, Inc.**, Cincinnati, has received an order for Permite aluminum pistons, aluminum connecting rods, steel shafts, piston pins and piston rings from Auto Compressor Co., Wilmington, Ohio, for equipping 10,000 refrigerator units.

## ◀ SOUTHWEST ▶

**Missouri-Pacific Railroad Co.**, St. Louis, will begin superstructure for eight-story work house addition, 80 x 115 ft., for grain elevator at Kansas City, Mo. Cost over \$400,000 with machinery. Unit will be operated under lease by Hall-Baker Grain Co., Board of Trade Building, Kansas City. A. E. Hadley is chief engineer for railroad.

**Forrest City Cotton Oil Mill**, Forrest City, Ark., plans rebuilding part of plant recently destroyed by fire. Loss about \$40,000 with equipment.

**Airport Committee, City Council**, Oklahoma City, has work under way on one-story hangar, 120 x 148 ft., at municipal airport, with repair shop. Cost about \$50,000 with equipment. M. B. Baldwin, Magnolia Building, is architect. L. M. Bush is city engineer.

**Telephone Bond & Share Co.**, 101 West Eleventh Street, Kansas City, Mo., is considering new radio broadcasting and telephone sta-

tion near Ketchikan, Alaska, with steel towers, power units, etc. Cost over \$85,000 with equipment.

**Anydepth Air Pumps, Inc.**, St. Louis, recently organized by L. R. Klinger, 1611 North Broadway, and associates, plans production of pumping machinery for water and other service. Company will operate plant later. Has arranged with Master Machine & Tool Co., 1609 Broadway, for experimental work and manufacture of initial units.

**Board of Education**, Board of Education Building, St. Louis, will build one-story manual training shop at three-story high school at Kingshighway and Arsenal Street. Bids will be asked soon on general contract. Cost about \$900,000. Architectural department, address noted, in charge.

**City Council**, Colby, Kan., asks bids until May 19 for pumping machinery, valves, filters, screening machinery, etc., for municipal sewage disposal plant. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

**Quartermaster Supply Officer**, Fort Sam Houston, Tex., asks bids until May 11 for 16 scales (Circular 213).

**Texas Elf Carbon Co.**, Pampa, Tex., let general contract to Cabot Shops, Inc., Pampa, for rebuilding part of plant recently destroyed by fire, including three main one-story units, 60 x 310 ft., 60 x 80 ft. and 65 x 80 ft., last noted for storage and distribution. Cost about \$80,000 with machinery.

**Continental Can Co.**, 1 Pershing Square, New York, will take bids on general contract early in summer for new plant on site recently purchased at Houston, Tex. Cost about \$100,000 with equipment. Favrot & Livaudais, Nolan Building, New Orleans, are architects and engineers.

**Quartermaster**, Duncan Field, San Antonio, Tex., asks bids until May 18 for new boiler for crane unit (Circular 2).

**Board of Trustees, Texas Agricultural and Mechanical College**, College Station, Tex., asks bids on general contract until May 10 for four-story petroleum engineering and general engineering experiment building, 52 x 186 ft., with wing, 56 x 70 ft. Cost over \$200,000 with equipment. Dr. V. E. Giesecke is college architect.

**State Highway Commission**, Austin, Tex., is planning one-story division equipment storage and repair shop at Beaumont, Tex. Cost about \$20,000 with equipment.

**Common Council**, Arp, near Troup, Tex., plans installation of 50,000-gal. elevated steel tank and tower, 30,000-gal. subsurface tank, pumping machinery and auxiliary equipment for new municipal waterworks and sewage system. Fund of \$70,000 has been authorized.

## ◀ NEW ENGLAND ▶

**Tide Water Oil Sales Corp.**, 17 Battery Place, New York, affiliated with Tide Water Oil Co., has acquired 42 acre tract at Revere, Mass., for new bulk oil storage and distributing plant. Cost over \$500,000 with equipment.

**Commanding Officer, Springfield Armory**, Springfield, Mass., asks bids until May 18 for 544,000 metallic belt links (Circular 45).

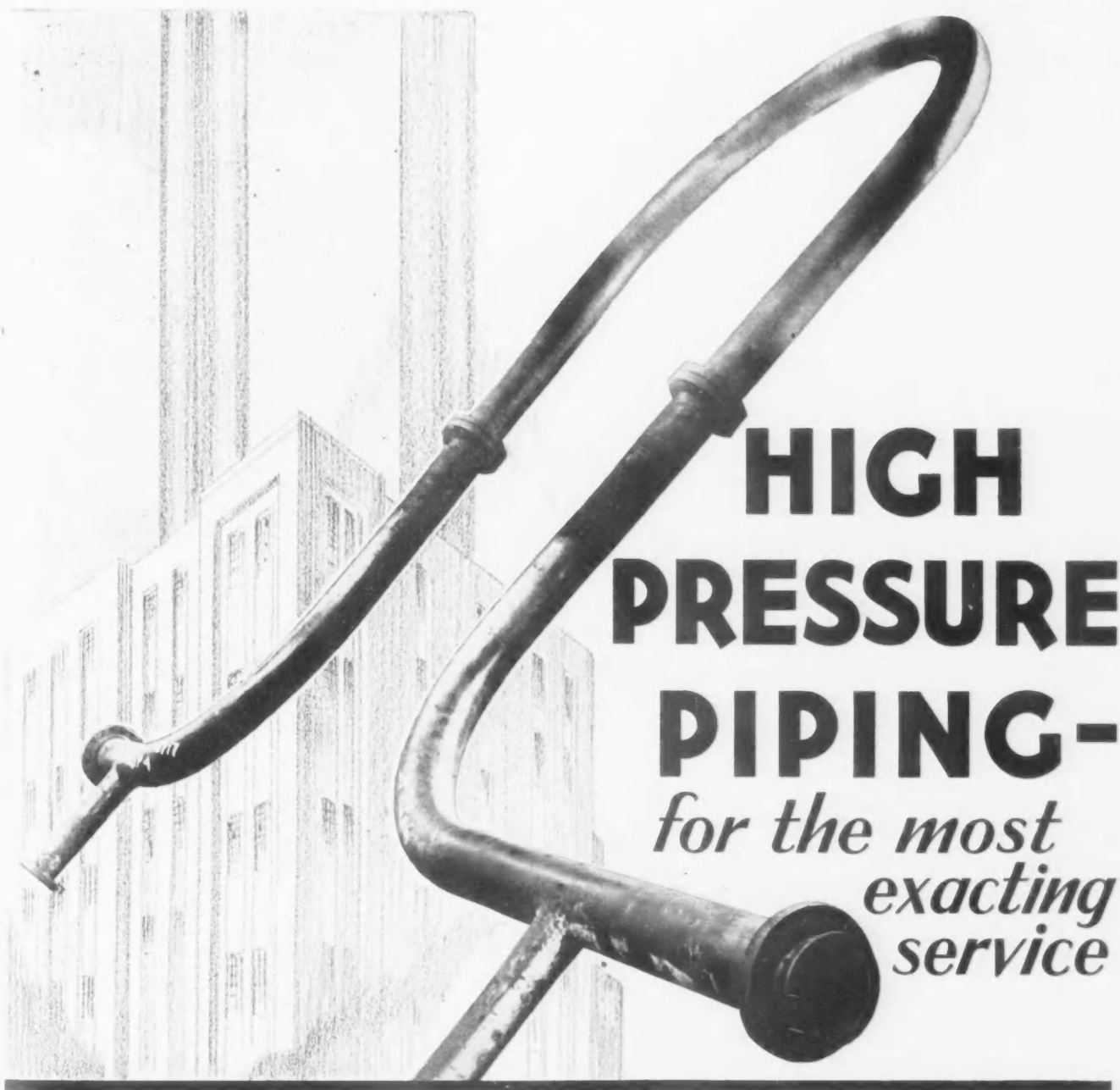
**Narragansett Electric Co.**, Providence, R. I., is disposing of a bond issue of \$3,750,000, part of proceeds to be used for extensions and improvements in plants and system.

**Kushionsat Valve & Mfg. Co.**, Salem, Mass., has been organized by Edward H. Swain, 115 Ocean Street, Lynn, Mass., and Lester H. Lasher, Salem, capital \$50,000, to manufacture valves and kindred engineering products.

**Edgar Irish**, Hartford, Me., operating lumber properties, and Alfred A. Montgomery, Portland, Me., are at head of project to erect a pulp and paper mill with power plant, logging railroad, etc., at Bay St. George, Newfoundland. Mill will have initial capacity of 500 tons a day. Entire project will cost over \$2,500,000. House of Assembly, St. Johns, Newfoundland, is considering bill to permit project.

**Bureau of Supplies and Accounts, Navy Department**, Washington, asks bids until May 10 for two hydraulic forcing presses, 75 and 35-tons capacity, respectively, for Boston Navy Yard (Schedule 7939).

**New England Terminal Co.**, Quincy, Mass., Matthew P. Sheahan, 46 Bates Avenue, head, will soon award contracts for new bulk oil storage and distributing plant on Neponset River, where company has 74-acre tract. Nine buildings will be erected, including pumping plant, tanks, etc., for capacity of 860,000 bbl. Cost about \$1,500,000 with equipment. George



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# NATIONAL SEAMLESS



H. Dyson, 80 Boylston Street, Boston, is engineer.

United Airports of Connecticut, Inc., East Hartford, has taken over 100-acre tract adjoining local airport, known as Rentschler Field, and will carry out expansion program.

Automatic Signal Corp., New Haven, Conn., has secured contract from city of Montreal for traffic-actuated automobile signals, totaling \$150,000.

Martha's Vineyard Shipbuilding Co., Vineyard Haven, Mass., will soon start work on six marine railways and other plant improvements.

## ◀ MIDDLE WEST ▶

Enterprise Optical Mfg. Co., 564 West Randolph Street, Chicago, manufacturer of motion picture projection equipment, parts, etc., has leased factory, 100 x 300 ft., at Lake Street and Kilbourn Avenue for new plant.

Quartermaster Depot, Army Corps, Chicago, asks bids until May 17 for quantity of scythe blades, horseshoes, 6850 lb. horseshoe nails and other supplies (Circular 99).

Prairie State Paper Mills, Inc., Joliet, Ill., recently organized with capital of \$100,000, has taken over former mill of Eagle Paper Co. for new plant, specializing in production of wrapping papers and other heavy paper stocks. Herman J. Finder is president; D. H. Greene, formerly manager of Wisconsin Tissue Mills, Menasha, Wis., is general manager.

Town Council, Lenox, Iowa, asks bids until May 16 for equipment for municipal electric light and power plant, for which fund of \$100,000 recently was voted, including two full Diesel engine-generating units, with direct-connected alternators and exciters, transformers, meters and other equipment. L. B. Carruthers is town clerk.

John Morrell & Co., Ottumwa, Iowa, meat packers, let general contract to Theodore Stark Construction Co., Cedar Rapids, Iowa, for six-story and basement addition, 120 x 160 ft. Cost over \$300,000 with machinery. H. P. Henschien, 59 East Van Buren Street, Chicago, is engineer.

City Council, Geneva, Ill., Victor Johnson, clerk, asks bids until May 16 for water storage tank for water supply system.

Rich Illinois Mfg. Co., 610 West Wall Street, Morrison, Ill., has been organized by M. E. Rich and A. W. Collins, Morrison, capital \$150,000, to manufacture electric refrigerators.

City Council, Atlantic, Iowa, is considering extensions and improvements in municipal electric light and power plant, including installation of new equipment. Cost about \$30,000. T. E. Nichols is plant superintendent.

Minnesota Fence & Wire Works, 240-2 University Avenue, Minneapolis, has plans for two story addition, with improvements in present factory. Max O. Buetow, 1380 Blair Street, is architect.

City Council, Sioux Falls, S. D., has plans for extensions and improvements in municipal electric power plant, to include installation of Diesel engine unit and auxiliary equipment. Cost about \$85,000 with machinery. Pillsbury Engineering Co., 1200 Second Avenue South, Minneapolis, is consulting engineer.

Hammond Clock Co., 2911 North Western Avenue, Chicago, manufacturer of electric clocks, is increasing production at plant and expects to be on capacity schedule soon for a new model. Company is also advancing manufacture at branch plant at Toronto, Ont., which recently secured order for 100,000 electric clock units.

Mancha Storage Battery Locomotive Co., 4850 South Halstead Street, Chicago, has been organized by Fred H. Johnston and H. R. Horton to manufacture locomotive equipment and operate machine shop and foundry.

Allis-Chalmers Mfg. Co., Milwaukee, has placed contract with Meredith Brothers Co., 121 East Washington Street, for a one-story shop extension, 50 x 70 ft., costing about \$40,000 with equipment.

Corben Sport Plane Co., Peru, Ind., manufacturer of light aircraft and parts, has transferred plant and offices to Madison, Wis., where it occupies structure at 2002 East Johnson Street, adjacent to Madison airport. L. F. Schoelkopf, proprietor of airport, recently acquired major interest in Corben company and becomes president. O. G. Corben remains general manager and is vice president.

Jenkins Machinery Co., Sheboygan Falls, Wis., has been incorporated to take over company of similar name, manufacturing wood-working machinery, in receivership for some time. Mark Hoeper, E. H. Clemens and Otto Kaufmann are principals.

## ◀ PACIFIC COAST ▶

Whepley Oil Co., Fresno, Cal., is interested in project to build new gasoline refinery with initial capacity of about 75,000 gal. daily. Unit will be built by an oil refining company operating in Signal Hill district, name temporarily withheld. Cost about \$100,000 with equipment.

Edwin J. Symmes, Haberfelde Building, Bakersfield, Cal., architect, is preparing plans for an electric-operated refrigerating plant. Cost about \$50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 10 for quantity of universal couplings (Schedule 7883), leaded and armored cable (Schedule 7927), 91,200 lb. flat galvanized steel (Schedule 7910); until May 17 for four feed-water regulators and spare parts and four boiler water level recorders (Schedule 7932), one motor-driven sliding head drill machine (Schedule 7970), 20,000 lb. steel wool (Schedule 7937), 90,000 lb. bar rivet steel (Schedule 7812), 6276 galvanized iron or steel deck and general purpose buckets (Schedule 7913) for Mare Island Navy Yard; until May 17 for circulating pumps for main motors and spare parts (Schedule 7836) for Puget Sound Navy Yard.

Alameda County Water District, Newark, Cal., plans early call for bids for one 10,000-gal. steel tank, pumping machinery and auxiliary equipment. Cyril Williams, Jr., 369 Pine Street, San Francisco, is engineer.

Associated Oil Co., 79 Montgomery Street, San Francisco, is considering new unit at plant at Avon, Cal., primarily for production of lubricating oils. Cost over \$200,000 with equipment.

Multnomah School District No. 1, East Sixth and Clackamas Streets, Portland, plans manual training department in two-story and basement Irvington school; bids being asked on general contract until May 10. Cost \$300,000. George H. Jones, Administration Building, is school architect.

Quartermaster, Fort Logan, Utah, asks bids until May 9 for ten cast iron jacketed steam boilers, 800 sq. ft. surface, and one such boiler, 1050 sq. ft. surface (Circular 40).

Victorville County Water District, Victorville, Cal., plans early call for bids for pumping machinery and auxiliary equipment for new water system. Bond issue of \$50,000 being arranged. Charles L. Foulke, 455 Fourth Street, San Bernardino, Cal., is engineer.

Douglas Steam Engineering Co., Inc., Seattle, care of Chester N. Nilsson, Henry Building, has been organized by Archie Douglas and M. J. Sax, capital \$50,000, to manufacture steam power equipment, including steam generator systems.

## ◀ CANADA ▶

Greater Vancouver Water Board, E. A. Cleveland, chairman, and W. H. Powell, engineer, Bekins Building, Vancouver, B. C., is receiving bids until May 27 for following equipment in connection with construction of a pressure tunnel under First Narrows: Two 48-in. cast steel gate valves and one 36-in. cast steel or iron gate valve, 16 cast steel pipes and bends complete, two steel shaft caps with four outlets, eight 48-in. cast steel blind flanges.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, will erect a plant at Copper Cliff, Ont., for manufacture of sodium and aluminum sulphate. Cost about \$500,000.

Pressure Pine Co. of Canada, Ltd., 1404 Standard Bank Building, Vancouver, B. C., has been incorporated with a capital stock of \$131,700. Main office is at 760 Victoria Square, Montreal. Company is establishing a plant in Vancouver for manufacture of pipe, etc.

## ◀ FOREIGN ▶

Ministry of Public Works, Bogota, Colombia, awarded final contract with Frederick Snare Corp., 114 Liberty Street, New York, for ocean and river port works at Cartagena, including dredging of harbor and Dique Canal, 1065-ft. wharf, warehouses and other structures, airport with hangars and shops, electric power plant and mechanical and electrical equipment. Cost \$2,850,000. Contracting company will expend close to \$1,000,000 for machinery and equipment in United States. Work will require about 24 months and is scheduled to begin in about 90 days. Andean National Corp., Cartagena, a Canadian subsidiary of Standard Oil Co. of New Jersey, New York, operating oil properties and pipe lines in Colombia, is identified with project.

Persian State Railways, Office of General Manager, Teheran, Persia, asks bids until

June 1 for cold-drawn boiler tubes, copper ferrules for boiler tubes and other supplies for next 12 months.

Commissariat for Agriculture, Soviet Russian Government, Moscow, has authorized erection of 31 power plants and 95 power substations during present year for electric power service for agricultural work; also, construction of 20 windmill units for generating electric power for farms. Cost about 33,000,000 rubles (\$15,500,000). Government has approved fund of 2,500,000 rubles (about \$1,250,000) for reconstruction of meat-packing plant at Odessa. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency.

## Trade Notes

Jefferson Electric Co. has completed removal from its plants Nos. 1, 2 and 3 and now manufactures fuses, outlets and switch boxes, transformers and ignition coils under one roof in its new large plant at Belwood, Ill., just west of Chicago. The plant is served by the Indiana Harbor Belt Railway, the Chicago, Aurora & Elgin Railroad, the Chicago Great Western and a freight line of the Chicago & North Western.

Pittsburgh Equitable Meter Co., 400 Lexington Avenue, Pittsburgh, has completed arrangements to acquire the capital stock of Merco Nordstrom Valve Co., San Francisco, and the latter will operate as a division of the former company. The Pittsburgh concern, a leading manufacturer of meters and regulators, was founded by the late George Westinghouse. The valve company was founded by S. J. Nordstrom, who invented the Sealport type of lubricated plug valve which is extensively used in the chemical, oil, gas, paper and power industries and in the municipal field.

Electric Furnace Co., Salem, Ohio, has purchased the business of the Process Engineering & Equipment Corp., Attleboro, Mass., builder of Preeco bright annealing and controlled atmosphere furnaces, and has moved the equipment of that company to Salem. The Process company has specialized on bright annealing and controlled atmosphere furnaces employing a principle which prevents oxidation and the formation of scale by the use of gas or vapor to exclude air during heating and cooling. The Electric Furnace Co., with its own newly developed bright annealing process and, with the acquisition of the Process company, now offers both large and small production furnaces with controlled atmosphere for bright-annealing tubes, sheets, strip and other products, both in ferrous and non-ferrous metals. J. F. Schrumm, formerly technologist of the Process company, is now connected with the Electric Furnace Co. at Salem.

Globe-Wernicke Co., Cincinnati, manufacturer of office furniture, may be reorganized. Such action was suggested, last week, by H. C. Yeiser, Jr., president, in a letter to stock and bondholders. Separate committees, appointed by common and preferred stockholders, are urged. Resort to court action to effect the reorganization would involve a severe loss, he counsels, while a voluntary revamping of the company will be at a minimum expense.

Pioneer Engineering & Mfg. Co., Detroit, manufacturer and distributor of Rollway coolant and lubricant pumps, Pioneer multiple-spindle drill heads and electro-chemical copper patterns, has signed exclusive sales agency contracts with the Banner Machine Tool & Supply Co., St. Louis; the Machinery Sales & Engineering Co., Indianapolis; and Walter J. Whitley, Syracuse, N. Y.

John E. Livingstone Co., General Motors Building, Detroit, has been appointed sales agent for the hoist and crane division of Robbins & Myers, Inc., Springfield, Ohio, covering the Detroit territory.

## New Trade Publications

Hot Strip Reels.—United Engineering & Foundry Co., Pittsburgh. Bulletin N-301 devoted to company's hot strip reels for reeling, coiling, winding, rewinding, recoiling and coiling of hot-rolled metal strips in rolling mill work. All units are roller-bearing equipped, and full-automatic, semi-automatic and hand-operated models are offered. The booklet is illustrated with photographs of equipment in active production, and with many diagrams.

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## THE SEYMOUR MANUFACTURING CO.

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SEYMOUR NICKEL SILVER and PHOSPHOR BRONZE  
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## Welding Engineers Discuss Progress

(Concluded from page 1022)

workers in many laboratories. The problem of prevention has also had serious attention, and it now seems that the reasons which have deterred many prospective users from availing themselves of the general corrosion-resistant advantages of these steels have been entirely removed so far as the great majority of potential applications in industry are concerned."

### Production Welding of Light Gage Metal

THE design of Electrolux gas refrigerators involves an intricate system of piping and small containers which in the construction of each unit are joined with 78 individual welds. The extremely difficult problem of putting all of these welds on a mass production basis was described in much detail and with the use of lantern slides in a paper read by Mr. Hainsworth but written by W. R. Campbell and R. S. Taylor, both associated with Servel, Inc., Evansville, Ind.

The Servel plant is almost completely operated on the conveyor belt principle and the authors believe this is the first time that hand welding on such an extensive basis has been adapted to moving belts. When the idea was first suggested many engineers said it could not be done but it is now working and working satisfactorily and has, according to the authors, a capacity of 75 units per hour. The welding is nearly all done with oxy-acetylene torches.

A doubt expressed when this type of refrigerator was first designed concerned the diffusion of hydrogen through steel. In the operation of the refrigerator, hydrogen in one of the containers must be held at 200 lb. pressure. However, careful tests of the company's engineers indicated that while hydrogen at this pressure would gradually diffuse through the steel container it would take about 50 years for this diffusion to make any appreciable reduction in the container pressure. The paper described the care in educating welders. The general scheme has been to separate the different welding jobs into grades according to the difficulty or importance of the weld. The new operators start in on the easy and less important welds and are gradually moved up to the higher grades.

### Units Tested on Conveyor

On some of the welds women operators have been found more satisfactory than men. The conveyor belt travels at 5 ft. a minute and much of the work is done with the parts held in vises which form part of the conveyor. The scheme of keeping the parts moving at a uniform rate is to use more welders on the difficult operations.

The paper described what was stated

as one of the most unusual operations to be placed on a belt conveyor. This is the testing of the completed units with air at 1000 lb. pressure. The conveyor travels in a circular path around a central air distributing point and from this point the air is transferred to the units through many radial sections of hose. Each piece of hose from the supply center to the unit under test travels with the unit until the test has been completed and is then detached and carried back for attachment to a new unit.

Considerable discussion followed the presentation of this paper. Mr. Spoor asked the percentage of leaks appearing under the high pressure tests. Mr. Hainsworth said the units left the plant practically 100 per cent leak-proof but he said of course many leaks appeared at the first test. These leaks were mostly all minute pin-point leaks and the units were returned on the conveyor for repair. Asked if any attempt had been made to classify the different leaks, Mr. Hainsworth said the company had given much study to it. Some leaks he said are due to the fact that the material itself often does not come up to specifications. Some of the tubing has been found to show leaks under the 1000 lb. soap water test at points removed from the welds. He said that all the units are put through an automatic galvanizing process after all welds have been made and stated that this in itself was a severe test and undoubtedly was the cause of a good many of the small leaks. However, he said that the advantage of galvanizing over painting or other method of surface protection was sufficient to warrant them to continue the practice. An interesting feature which came out in the discussion was the fact that the welding operators standing along the conveyor line have torches which are automatically lighted and extinguished. When an operator hangs up his or her torch on a convenient overhead hook, the weight of the torch shuts off the supply of gas and oxygen. Then when the torch is removed from the hook a pilot light ignites the flame as the supply of gas and oxygen is released.

### Welding of Extruded Metal

Complicated, decorative architectural shapes are successfully extruded in many of the bronze type of alloys according to Ira T. Hook, research engineer, American Brass Co., Waterbury, Conn., who prepared a paper on the welding of extruded bronze. He said that the two groups of alloys most readily extrudable were those carrying from 38 to 45 per cent zinc and those which carry from 5 to 10 per cent aluminum. A new alloy which lends itself particularly well to extrusion and to subsequent welding,

he said, contains in addition to zinc small percentages of manganese and silicon. This and most other extruded metals melt at between 1600 and 1800 deg. F., which temperatures are about 1000 deg. below the melting point of steel. Therefore, it is necessary to develop a new welding technique for the extruded metals.

In general, Mr. Hook said that with extruded metal a larger tip was used and also the point of the white cone of the blast was held further away from the metal. Often, he said, it is necessary or advisable to pre-heat the base material before welding. This is due to its high heat conductivity which otherwise causes too rapid cooling of the deposited metal. He said that the metallic arc method of welding had not been developed as yet to a point where it was very successful on extruded metal but, he said, there were many other methods of joining this metal which were found useful under certain conditions.

He spoke of soft soldering for which an acetylene atmospheric air torch is coming into use. While the carbon arc is used to some extent for welding this material it has been found difficult to get the base metal hot enough by this means. Spot welding is coming into general practice. The chief difference between extruded metal and steel in this regard is the necessity for having more accurately controlled pressure. On all important welding on extruded architectural shapes it is advisable not to make any stop at all in the welding of a seam. He advised against even a slight break to permit the operator to dip the rod in flux. To avoid this the rod should be coated with flux. In the discussion following this paper, Mr. Hook was asked whether he used a neutral or oxidizing flame. He said he preferred a slightly oxidizing flame and that this was secured by moving the flame away from the metal as described.

One engineer described his experience with welding extruded metal. He said he found that by gradually turning down the supply of acetylene the flame first shortens and then lengthens and loses much of its luminosity. This latter condition he found best suited to this type of welding.

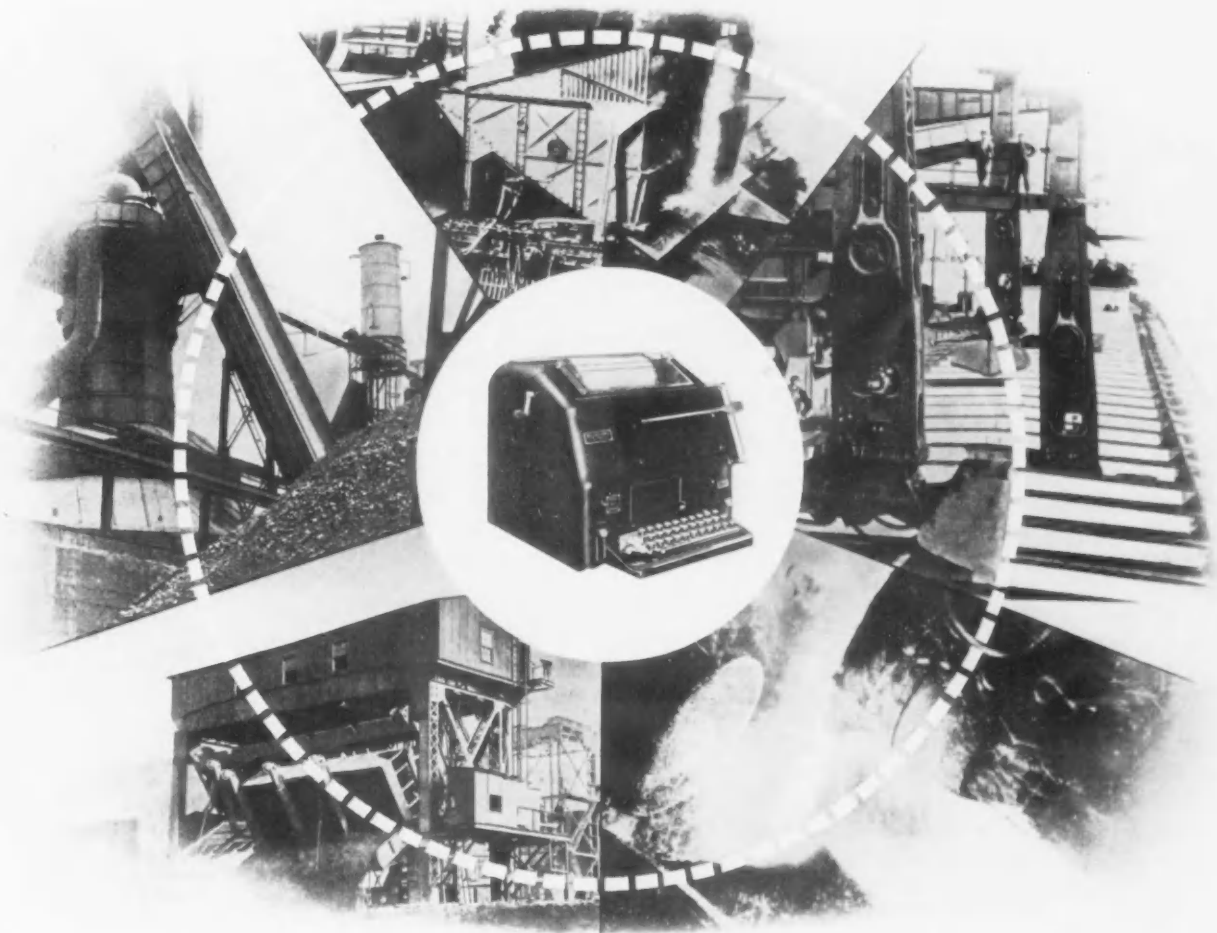
### To Make Supplementary Structural Steel Welding Studies

A program of further investigation has been prepared by a committee of the Structural Steel Welding Committee of the American Bureau of Welding, the research department of the welding society, which held its annual meeting on April 29.

The program contemplates investigation of welding on flame cut edges of structural steel; welding of copper bearing and of silicon structural steels; and an investigation of slot and notch welds. These items constitute four of the ten additional studies recommended in the report of the structural steel research committee published last fall.



# CENTRAL CONTROL



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## What to Consider Before Relocating a Plant

(Concluded from page 1009)

over a period, which depends on the hazard of the local situation and the current demand for such property. Basic data for such estimates are best obtained from property control records, and where a detailed appraisal of land, buildings and equipment is available, it will prove of much value.

The material has to be further amplified by estimates of the remaining serviceable life of the major units of equipment, not allowing for existing obsolescence due to factors which would be eliminated through the planned relocation; to be conservative, normal wear and tear only at the established rate of production should be reflected. Very often the property accounts for the largest and most decisive portion of the cost of moving, thereby justifying a broad scope of detail in the analysis. An appraisal report designed to set forth clearly the extent, character and condition of the facilities and their adaptability to other industrial uses is essential to a complete comparison and frequently is an important factor thereafter in concluding negotiations for actual disposal.

Table III comprises an orderly summary of the information which should be assembled in estimating removal costs. The higher price of land improvements at site "B" is due to the dock facilities, which also account for the additional amount shown for the installed cost of new equipment.

The direct cost of moving machinery, patterns, finished merchandise and business records can be readily established. The "indirect" costs, such as training of new employees due to plant changes in method or equipment, must be conservatively estimated, especially where it is not feasible to transfer most of the foremen and skilled workers. Time losses in getting normal production under way may run into large amounts, unless careful planning provides for duplicate facilities at every step—seldom possible of achievement in practice.

Here again, the question "when to move?" asserts itself. It is desirable to select a period of seasonal slowing down of production and decreased inventories, in order to reduce the element of valuable time, inevitably lost.

### Distribution Costs

We have so far given our attention exclusively to the production end of

the comparative analysis, which in many cases is of less importance than that of distribution. Table IV outlines a method of presentation which gives effect to a partial shift from rail to water and truck delivery and to the shortened distances to the main centers of consumption from the new location. Again, the units of merchandise distributed should represent a forecast rather than a present condition or an average of past experience. Our example indicates the advantage of water shipments of the product, which is added to the cheapening of the delivered cost of raw materials and fuel in Table II, to make site "B" more attractive. However, the balancing influence of the larger investment required must be ultimately considered.

### Making the Decision

The final presentation of facts is given in Table V by summarizing monetary annual advantages as compiled in previous tables and comparing them with the total additional investment. The amortization of the cost of moving requires a fair return, dependent on the hazards involved. Not only the nature of the improvements or facilities, but the probable continuity of the estimated savings must be considered. If all factors have been forecast with conservatism, a relatively long period for the amortization of the capital expenditure may be satisfactory. On the other hand, if the majority of all anticipated advantages is concentrated in one or two points, such as transportation rates or the proximity of a large customer, these costs should be recovered within three or four years—less in some instances—to make the project attractive.

The indicated method of evaluation of the data is, of course, not the only possible one. Another approach, but which would be based upon the compilation of identical information, would be a comparison of the percentage of net earnings on the resulting total investment in the alternative locations, instead of limiting the computation to the amortization of the additional investment by the savings over and above present earnings as in the foregoing.

Some considerations affect the ultimate decision, which are not subject to expression in dollars or financial ratios. The "living appeal" varies in each community. This refers not

only to the outward appearance of commercial and residential districts, but also includes those more intangible values, only inadequately measured by the standards of schools, clubs, theaters, churches, stores and recreational facilities. Important, also, are the limitations of banking facilities in smaller communities and other local business relations, generally centralized in trade associations.

A procedure applying to complete relocation of an enterprise has been described. Similar reasoning prevails in regard to the consolidation or establishment of branches and warehouses—or to any other part of the vast complex of questions of location, which in its ramifications affects every item on the corporation's earning statement. These decisions are in every instance momentous enough to warrant substantial expenditure in time and money by responsible management to assemble all of the facts and present them in a form that will permit ready and accurate comparisons.

## Surveys Fuel Economy in Iron and Steel

Recently awarded the gold medal of the (British) Institute of Fuel, Prof. W. A. Bone delivered the Melchett lecture before that body early in February, taking as his subject "A Century of Fuel Economy." He pointed out that a century ago the world's production of iron was certainly less than 2,000,000 tons a year, whereas in 1929 it reached 97,250,000 tons, a fifty-fold increase. For coal no precise figures were available, but the lecturer quoted Sir Richard Redmayne's estimate that the whole world's output was 28,300,000 tons, whereas in 1929 it was just over 1,300,000,000 tons, or about 500 lb. per head per annum.

"The dawn of fuel economy," declared Professor Bone, "was signalized in 1828 by J. B. Neilson, who invented the hot-blast in iron smelting. The first trials of the invention were made near Glasgow in 1829. The total consumption fell from 8 tons 1 1/4 cwt. (8.06 gross tons) per ton with cold blast to 5 tons 3 1/4 cwt. (5.16 gross tons) with blast heated to only 300 deg. F. In 1833 with blast heated to 613 deg., it was further reduced to 2.26 tons, and, moreover, the average furnace output had increased from 36.9 tons a week with cold blast in 1829 to 61.05 tons a week with blast at 615 deg. in 1833. Meanwhile, the hot blast had permitted the use of coal consumed in the furnaces.

In regard to steel, he was informed that in 1929 the best practice was at a works on the North-East Coast, where the total consumption is of the order of 500,000 tons for an output of nearly 240,000 tons of finished steel, just under 2.1 tons per ton of steel.

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